ROADS and STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

Gillette Publishing Co., 22 West Maple St.
Chicago 10, Illinois

SEPTEMBER 1955

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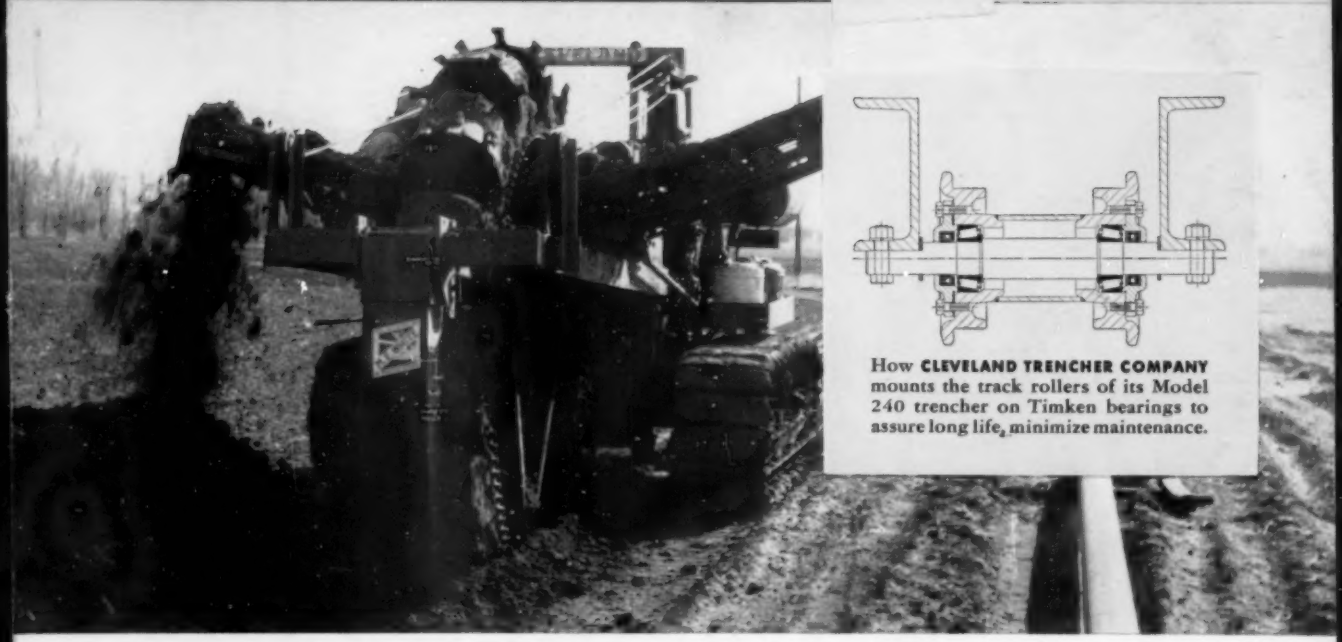
celerograph" — How it
lps Control Blasting

que Converter
Direct Drive

page 4 for contents

New Equipment, Page 14

opted as Controlled Circulation
lication at Cedar Rapids, Iowa



How **CLEVELAND TRENCHER COMPANY** mounts the track rollers of its Model 240 trencher on Timken bearings to assure long life, minimize maintenance.

TIMKEN® bearings cut lubrication checks from once a day to once a month

THIS Cleveland trencher's track rollers used to demand a daily oil check. Now, with Timken® bearings, one check a month is plenty. One reason: because of their high accuracy, Timken bearings keep housings and shafts concentric, allow the use of a more effective lubricant seal. The tapered construction of Timken bearings prevents end play in the track rollers, eliminates pumping action which would pull dirt in, force oil out.

Timken bearings practically eliminate friction in the trencher's rollers. Their geometrically correct design and precision manufacture give them a true rolling motion. They normally last the life of the machine because they're engineered for the job and made of nickel-rich Timken fine alloy steel.

This "240" model trencher can dig a ditch 3′ wide and 6′ 3″ deep at 12 lineal feet a minute along wet right-of-way or up sloping hills. To take the combined radial and thrust loads, 68 Timken bearings were specified for the crawlers, transmission and front upper truck. Because of their tapered design, Timken bearings take radial and thrust loads in any combination, hold shafts in rigid, positive alignment, assure smooth gear meshing under sudden starts and stops.

Always specify Timken tapered roller bearings when you buy or build machines. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST ⬭ LOADS OR ANY COMBINATION ✳



P&H MITI-MIT® (Model 55TC) on road work in Colorado



P&H Model 155, ½-yd. dragline working near Tulsa, Okla.

P&H ...20 YEARS OF ALL-WELDED CONSTRUCTION

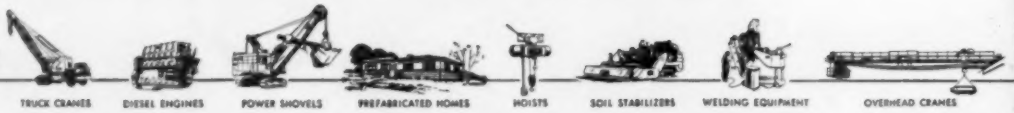
Harnischfeger Corporation produced the *first* all-welded excavator early in 1935. Why? Because 20 years ago, Harnischfeger realized that all-welded construction on excavators gave features such as these to P&H users:

1. The strongest construction known . . . stronger per pound of weight than comparable cast construction.
2. The best suited material for each component part of the excavator! The manufacturer is able to select the right combination of alloy steels for a particular function.
3. The elimination of dead weight! Thru a liberal use of alloy steels, it's possible to build up strength exactly where it's needed most. Gone are beefed-up, power consuming castings.
4. Revolving frame, including side stands, is built entirely of rolled steels and welded as a rigid unit, permitting machining as a single unit to insure perfect alignment.

Thru the years, thousands of P&H owners have enjoyed these cost-cutting advantages on their jobs. And, today, *P&H buyers have the added benefits gained in two decades of experience and know-how in all-welded construction.* See your P&H dealer or write P&H Power Crane and Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

the P&H Line

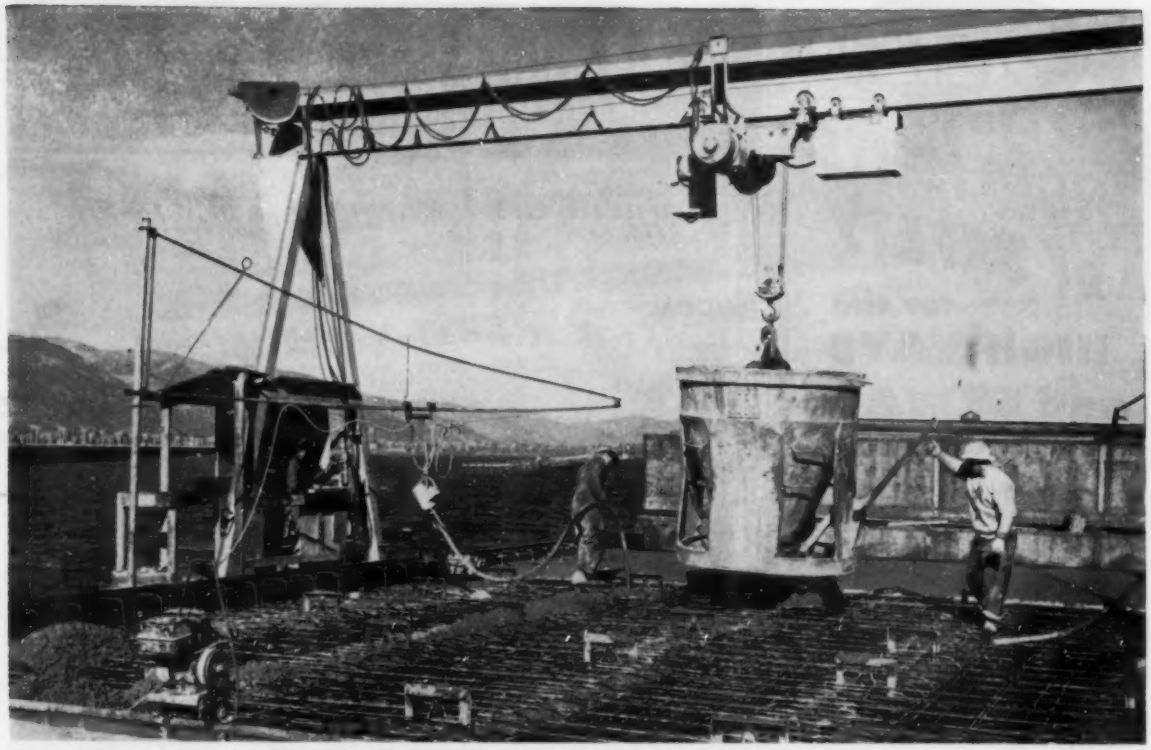


P&H 255-A trench hoe (¾-yd.) on ditching job in Quebec



255-A truck crane clears land for new road. Long Island, N. Y.





Joint contractors for the Lake Pend Oreille bridge are Peter Kiewit Sons' Co., Omaha, Neb., and Le Boeuf Dougherty Contracting Co. of Richmond, Calif. *Supervisory Authority:* Idaho Department of Highways. Seattle Concrete Pipe Co. is sub-contractor for precast concrete work on shore.

Steel-Reinforced Deck Units, 35 ft Long, Precast on Shore for Idaho Lake Bridge

When an old wooden bridge across Lake Pend Oreille in Idaho needed replacing, exhaustive studies were made as to the type of new bridge that would be built, and its exact location. The bridge is an important link in the route which connects northern Idaho with Spokane and other points south. A good deal of time and mileage are saved by crossing Lake Pend Oreille rather than going around it.

The new bridge, now under construction, is 6000 ft long. Basic design includes bents spaced generally every 35 ft except for an 82-ft navigation span. A complete concrete precasting and steam-curing operation was set up on shore to build 154 35-ft trestle spans and 25 half or 17-ft spans. Special equipment was devised to ferry and place the 70-ton,



Special floating derrick ferries deck unit to bridge. Each unit weighs about 70 tons.

30-ft-wide deck units. In addition, this equipment was used in setting forms and pouring the concrete for capping the piling.

The on-shore casting is done on a pier long enough to hold five deck units at a time. The slabs, which include stringers and curbing cast integrally with the deck, are lifted by coil loops cast in the longitudinal beams. Steam-curing on the site develops the concrete strength called for in the specifications in 48 hours.

Bethlehem is supplying 750 tons of reinforcing bars for the Lake Pend Oreille bridge. The bars are shipped completely fabricated, bundled and tagged, and ready for placing.

TEN BAR FABRICATING SHOPS AT YOUR SERVICE

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. . . for more details circle 184, page 14

DIETZ

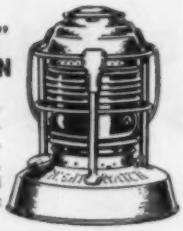
HIGHLIGHTS of SAFETY for the HIGHWAYS and BYWAYS



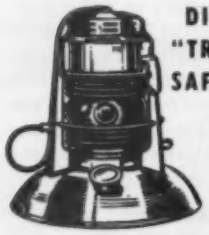
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. . . for more details circle 198, page 14

ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

Contents

SEPTEMBER, 1955 • VOL. 98 • NO. 9

EDITORIAL

Some Problems Can't Wait for Test Roads 41

IN THE NEWS

Nation's Press Voiced Its Feelings on Highway Bill 43

DEPARTMENTS

Washington News Letter — *By Duane L. Cronk* 19
Meetings Ahead 44
Job and Equipment Ideas 60
Engineering Digest — *By John C. Black* 74
Personals 100
New Publications 104, 108
Court Decisions That Affect Your Job — *By W. H. Hillyer* 143

ARTICLES

Vibration Recorder Helps Contractor Plan Safer Blasting 37
New Proving Ground for Ford 42
Two Pavement Types for Kansas Turnpike 44
Underwater Concreting Records Set at Mackinac Bridge 50
Horizontal Drilling — California Approach in Landslide Control — *By A. W. Root* 54
Cement Tanker Has Worm Spreader 58
Tractor Shovels Used as Concrete Buggies 59
Tractor-Mounted Drills — a Trend? 63
State Legislatures Didn't Do So Bad — *By Duane L. Cronk* 66
Torque Converter or Direct Drive — *By Kenneth F. Park* 70
Thruway Bridges Get Silicone Treatment 78
Bidders Submitted Own Plans for Difficult Bridge Repair Job — *By J. H. Gould* 81
How Clinton County Charts Its Snow Plowing Equipment-Hours —*By J. H. Coffey* 92
Vertical Sand Drains 98
Erection and Use of Scaffolds 102
Century Old Bridge to Be Monument 103

BITUMINOUS ROADS AND STREETS

Views and Comments — *By H. G. Nevitt* 133
How to Build Bituminous Shoulder — 2 Miles a Day 134
Emulsified Asphalt Solves County Road Maintenance Problems — *By L. H. Bradley* 138
Special Device Aids Fabric-in-Asphalt Placement 144

EQUIPMENT

What's New in Equipment and Materials 14, 109
Manufacturers' Literature 124
With the Manufacturers and Distributors 164

Accepted as Controlled Circulation Publication at Cedar Rapids, Iowa.
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Soon to be humming to the tune of 39,000 vehicles a day, Ohio's new 241-mile toll road, of twin 24-foot pavements on 200 foot right of way, is taking less than 3 years from start to finish! This fast-stepping 20-hour-a-day pace is maintained by equipment drawn from all over the country—much of it rolling on Goodyear earth-mover and off-road tires built with 3-T NYLON Cord.



Look for this sign; there's a Goodyear dealer near you

YOU set the pace—
TIRES OF 3-T NYLON CORD CAN TAKE IT!

Tires built with Goodyear's *exclusive*-process 3-T NYLON Cord have been on the toughest, fastest-moving jobs for almost 2 years. In that time, they've proved themselves *the greatest moneysavers for truckers and contractors in 20 years!* 3-T NYLON CORD keeps bruise breaks and heat blowouts close to the vanishing point, virtually eliminates ply separation and flex failure — keeps tires in shape for many more re-lugs and recaps. If you want to cut your tire-cost-per-job, specify Goodyear 3-T Cord tires—Rayon or Nylon—for everything that rolls!

Goodyear, Truck Tire Dept., Akron 16, Ohio

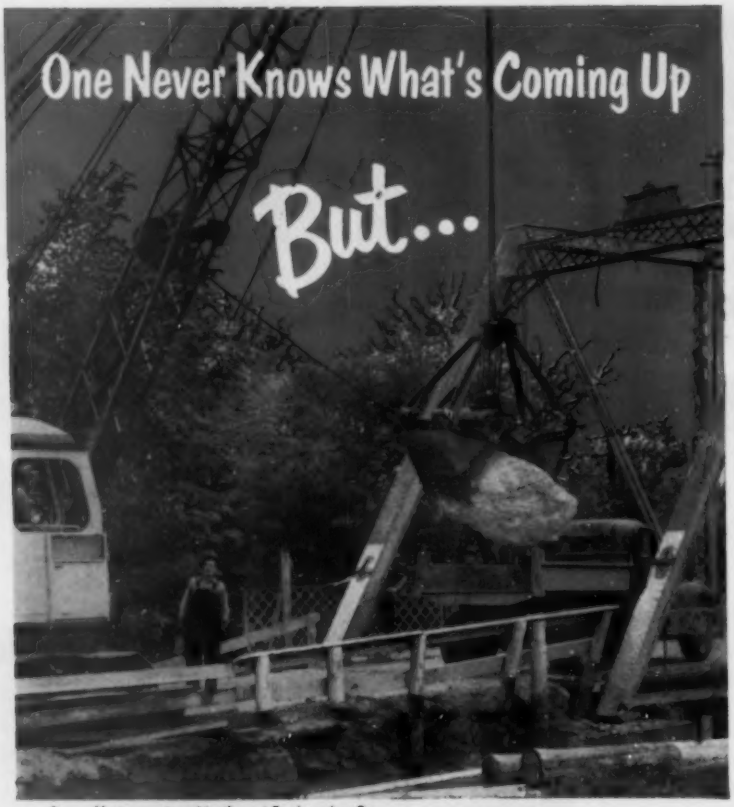
FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE BUILT WITH 3-T NYLON CORD

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Road Lug, Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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Crane Photo courtesy Northwest Engineering Co.

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If it's an OWEN

Experienced contractors can determine with reasonable accuracy the general digging conditions they face, but they can hardly anticipate encountering unusual conditions such as illustrated.

If their digging equipment embodies the needed factors of extra power and strength, these problems are "taken in their stride" and the object is removed with out delay.

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ROADS AND STREETS

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. . . for more details circle 243, page 14



Details the Inexpensive Methods Used to Assure Longer Surface Life for Highways, Roads, Streets and Airports

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- Facts About Soil-Cement
- Preparation of Materials
- Mixing
- Lay-Down
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- Useful Tables

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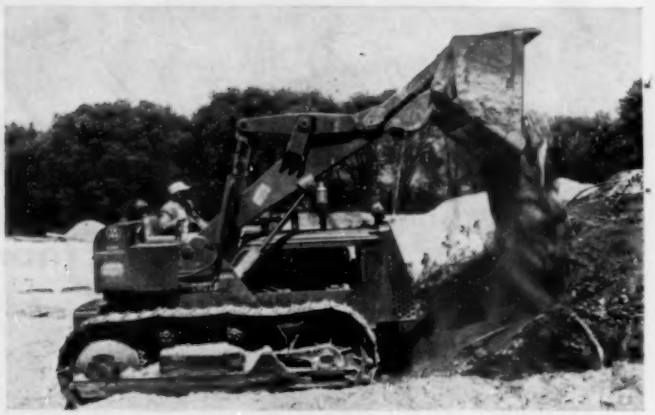
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. . . for more details circle 239, page 14

Tractor-wise Owners and Operators ...in New International



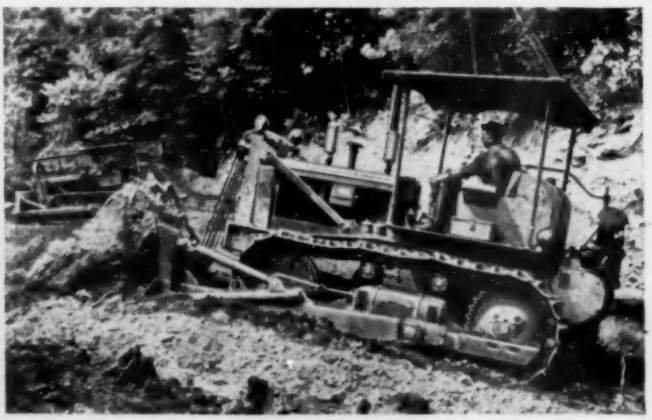
"IT CAN SELF-LOAD AND DELIVER FASTEST"—"International TD-18A improvements like the new 300% stronger track frames and cartridge-type track roller seals increase production, machine life, and operating ease. As for power, our new TD-18A can self-load the 8-11 cubic yard scraper and deliver fastest of any crawler we ever had." *Here's proof extra traction matches the TD-18A's power increase!* G. W. Owen, Warden, Henry County Public Works, McDonough, Georgia.



"EVERY LOAD'S A PAYLOAD"—"My International-Drott TD-18A Skid-Shovel is built for the operator's comfort. I know, because I'm the operator. It has 360° visibility which no other loader has. Every load is a payload." *No other outfit built gives you the TD-18A's combination of power, visibility and responsive controls. No wonder TD-18A handling ease turns "skinners" into high-producing operators throughout the day!* V. S. Steffes, Owner, Batavia, Illinois.



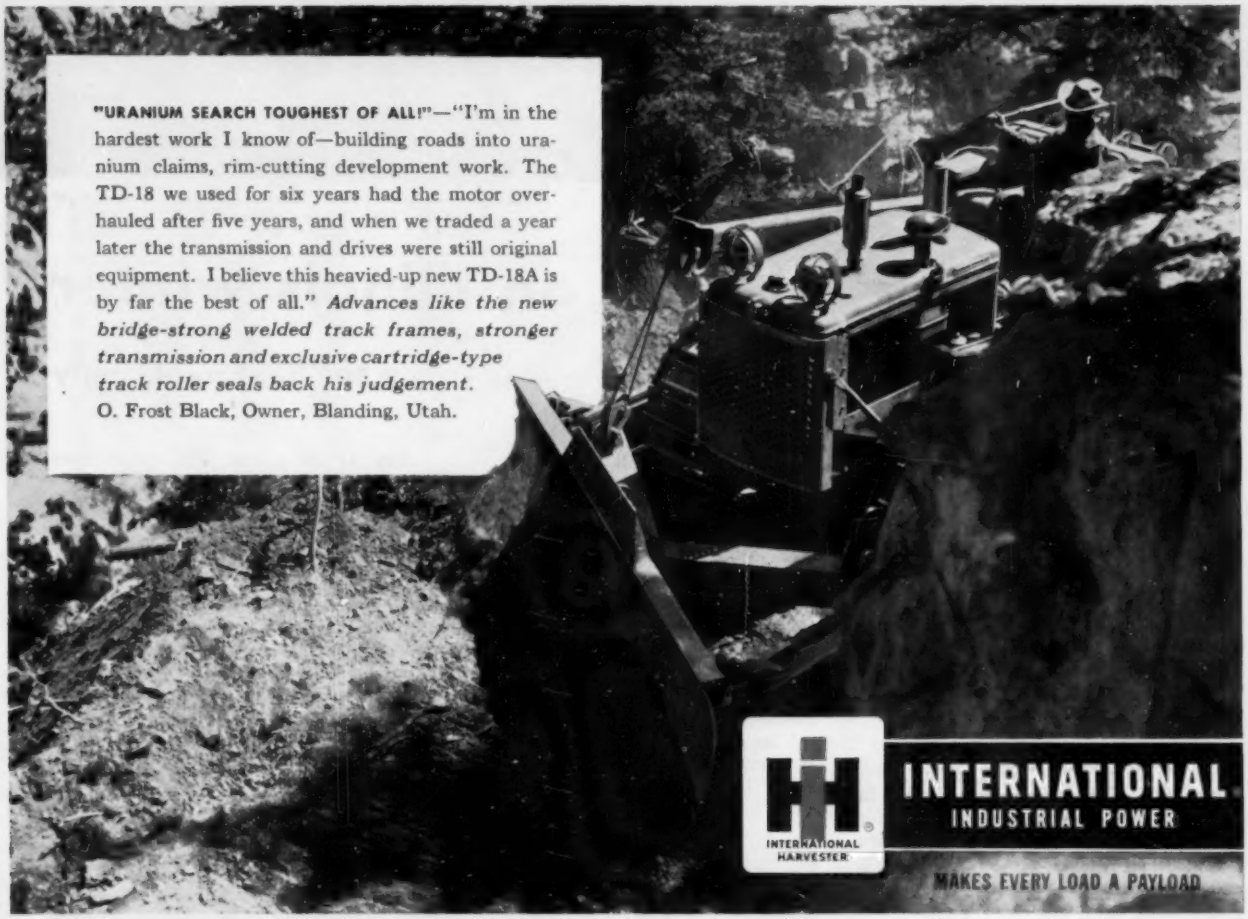
"OPERATORS FIGHT FOR NEW TD-18A"—"The TD-18A's were always good—fast, trouble-free performance and low operating cost made me money. The new TD-18A is stronger and really planned for the man in the seat. It has operators fighting for it." *Big, wide, comfortable cushions; hydraulic steering control boosters, and levers are conveniently grouped on the roomy, non-skid deck!* M. B. McKee, Chickasha, Oklahoma.



"LESS FATIGUE TO STRIP MORE COAL"—"There are two outstanding reasons why I like my new design International TD-18A. First it's designed to strip rugged terrain. And second, the operator can do more with less fatigue. The extended tracks enable working steep terrain with maximum production and safety." *Tough jobs, like coal-stripping, prove the TD-18A excels in ample new gear train strength, too!* Elmer Phillips General Manager, Little Beaver Mining Corporation, Beckley, West Virginia.

Report on the Decisive Difference

TD-18A Performance



Ease into foam-rubber-padded, panoramic-vision seat and see the *decisive difference*. Try new finger-tip power steering, and other big *job-easing incentives* for boosting production, as developed only by International. Prove TD-18A *full-power traction*—note, too, how the gear train is beefed-up to transmit 103 drawbar hp, and then some! Measure what new *300% stronger track frames* mean for *full-capacity performance* under slam-bang conditions. Compare how new *cartridge-type track roller seals*, and other International *downtime-prevention engineering*, beat anything else on tracks. Ask your nearby International Industrial Power distributor for a new TD-18A demonstration.

. . . for more details circle 218, page 14



Tournapull wastes 11 yard load in worked-out section of pit. Says Owner Erb, "I like Tournapull's maneuverability."

Dirtmoving through an Illinois winter

Owner reports Tournapulls wade through mud to strip 2,500 bank yards daily

Along about this time of year, you probably have done some serious thinking about winter work. The normal dirt season has carried most of the year's overhead for you, so any dirtmoving now should bring in good profits. Sure, you need the right machines and the right job! As you plan for them, perhaps you can get some ideas from this experience of the Elmhurst Chicago Stone Co., Elmhurst, Ill., and M. M. Erb, Naperville.

Starts work in November

The Elmhurst Chicago Stone Co. in November gave Mr. Erb a contract for stripping 250,000 yards of overburden from their gravel pit near Winfield, Ill. Although no completion date was specified, Elmhurst Chicago officials told Erb they "wanted stripping done as quickly as possible so their plant could run at full capacity throughout the next year."

That request meant moving dirt in late fall and straight through the Illinois winter. Rain, snow, and muddy ground would have to be overcome. The main problem for Contractor Erb was to select the machines which could work most efficiently. His choice was 2 electric-control 16-yard C Tournapulls. "I picked these machines," says Erb, "because of their well-known ability to work during rough going!"

Finishes "on time"

What happened after their November start shows how good a choice he made. The 2 C Tournapulls combined to move 2,500 bank yards of clay and loamy topsoil per 9-hour shift, day in and day out, through the winter. They averaged 1,800 ft. cycles every 4 minutes . . . at times, completed cycles as long as 2,000 ft. in 3½ minutes. Said Mr. Erb, "They went through mud better than anything else did." And they finished their 15-acre stripping assignment long before quarry operations had to be moved in from worked-out sections of the pit.

If you, too, plan work during the winter, or feel you might encounter muddy conditions any time on your job, it will pay you to check up on Tournapulls. Your LeTourneau-Westinghouse Distributor has a number of owner-verified reports like this which you can study to get some idea of costs and output. See him soon. He has a size Tournapull to fit your needs and your budget.



Loads with 225 hp pusher average 11 bank yds. of clay and topsoil. Says 'Pull operator J. W. Fessler, "This rig is simple and easy to operate. Vision is good."

Tournapull—Trademark Reg. U.S. Pat. Off. P-713-S-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

If this Isn't the WORLD'S BATCHING RECORD ...We'd like to know it!





With a BUTLER Roadbuilders Plant as the forward passer on the team, the Sargent Construction Company — on the Ohio Turnpike — laid 4368 lineal feet of concrete pavement 24 feet wide and 10 inches thick — *in one 16 hour day.*

The BUTLER Plant dished up that volume of concrete in 2424 batches.

Slide rules, gentlemen! That's at the rate of over 2½ batches per minute. And mind you, not just for one minute, not for just 10 minutes — but steadily for 16 long, gruelling hours.

The BUTLER Plant tossed these 2424 passes to two 34E pavers working in tandem. Even the large #44 elevator sweated to keep pace with BUTLER (and Sargent) batching.

Want more statistics?

21,798 bags of cement batched in 16 hours.
3,148 tons of stone
1,695 tons of sand

Moral? If you want to establish World's Records in production and profits — go BUTLER!



Want to find out about unbeatable portability in BUTLER Roadbuilders Plants? Just send a postcard for Bulletin 205. Savings of hours of downtime during moves often spell the difference between a loss or a handsome profit. Send that postcard — today.

BUTLER BIN COMPANY

959 BLACKSTONE AVE. • WAUKESHA, WISCONSIN

. . . for more details circle 188, page 14

WHAT'S NEW in Equipment and Materials

Three New Trucks

Three new cab-over-engine International models, the CO-180 series, introduced by the Motor Truck Division of International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill., are designed for better load distribution and easier maneuverability. The three models are the CO-180, with gross vehicle weight rating of 17,000 lb.; the CO-181, with GVW rating of 19,000 lb.; and the CO-182, with GVW rating of 21,000 lb. They are available in 99, 111, 123, 135, or 153-in. wheelbase.

The CO-180 series, which is equipped with the cab, frame, and front axle of the CO-190, is powered by the 137 h.p. International Black Diamond 282 engine. Transmission is five-speed; rear axle is the R-180 single-reduction. Brakes are hydraulic. Model CO-190 front springs and newly developed rear springs are standard. The International CO-180 series also is available with factory engineered low-frame chassis as an attachment in 153 and 165-in. wheelbases.

For more information circle 101 on Service Coupon this page and mail now.

Three New Tractors

Continuing its expansion in the farm and industrial tractor equipment field the Tractor and Implement Division of Ford Motor Co., 2500 East Maple St., Birmingham, Mich., has added three "special utility" models in two power series to its tractor line, bringing to 11 the number of Ford Tractor models introduced since January. The new four-wheel models are in two power series, and according to the manufacturer's rating, the "600" with 134 cu. in. engine displacement delivers approximately 26.8 h.p. at the drawbar, and the "800" with a 172 cu. in. displacement engine, delivers approximately 35 h.p. at the drawbar. They have been designated the models 620, 630 and 820.

For more information circle 102 on Service Coupon this page and mail now.

Diesel and Gas-Gasoline Engine Generators

A complete new line of diesel (5KW-200KW) and gas-gasoline (10KW-150-KW) engine generators for both continuous and standby duty have been announced by United States Motors Corporation, Oshkosh, Wis. The new models include engineering and design changes that have been in the process of development for the past six years. The principle objective was to refine a design, proven by years of experience, to simplify and reduce installation costs and to make maintenance easy and inexpensive.

The recently released U. S. Engine Generator line includes portable, mobile and stationary units with adaptations available for individual installations. The entire line is described in two folders available upon request from United States Motors Corporation, Oshkosh, Wis.

For more information circle 103 on Service Coupon this page and mail now.

Refuse Collecting and Compacting Truck Bodies

A new line of Load-Packers, refuse collection and compacting truck bodies, has been announced by Gar Wood Industries, Inc., Wayne, Mich. Retaining all of the tested safety features and economy factors of the already familiar Gar Wood Load-Packer line, the new line of bodies brings years of extensive engineering research on refuse collection and compaction to fruition.

Gate closing and compacting controls are now fully automatic. A new system has simplified the operation so that it is no longer necessary to hold the door-closing lever in position while waiting for the door to float closed. Now only one lever is tripped, once, and the door floats closed, compacts the rubbish and refuse into the body, and then the door re-opens, ready for another load. The compacting door can be stopped at any place in its cycle by the control lever, or even by the operator's hand, without injury. The entire compacting cycle takes place within the Load-Packer body where the tons of force exerted cannot possibly injure a worker.

More equipment news begins on page 109

The entire packing cycle has been shortened and made much quicker by the introduction of a new micro-switch solenoid that permits full speed opening of the door throughout its entire travel. No safety features have been sacrificed in speeding up the operation. The hydraulic system has been greatly simplified. One valve now controls both the ram and retainer panel and only one adjustment takes care of both ram and retainer panel eliminating the chore of synchronization.

For more information circle 104 on Service Coupon this page and mail now.

Fractional Horsepower Jet Pump Motors

The Electric Motor Division, A. O. Smith Corp., 227 Helena St., Dayton 4, O., is in production on a new line of fractional horsepower jet pump motors which features a number of improvements, including a totally enclosed canopy housing that protects the vital parts from dirt, insects or rodents.

With the addition of vent slots to the main frame of the motor, the unit now also has a new controlled ventilating system. Airflow is aimed at the coils; ball bearings are now practically out of the air stream, with the result that contamination of bearings by air-borne grit is minimized.

For more information circle 105 on Service Coupon this page and mail now.

For more items . . . see page 109

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE NUMBERS AND MAIL NOW!

Please send me further information on products and materials mentioned in the September Roads & Streets as circled below

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								101	102	103	104	105	106
107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134
135	136	137	138	139	140	141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171	172	173	174	175	176

Further Information on Advertised Products:

177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204
205	206	207	208	209	210	211	212	213	214	215	216	217	218
219	220	221	222	223	224	225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240	241	242	243	244	245	246
247	248	249	250	251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270	271	272	273	274
275	276	277	278	279	280	281	282	283	284	285	286	287	288
289	290												

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NOT GOOD AFTER OCTOBER 15, 1955

A READER SERVICE FOR YOUR NEEDS

NEW H-5

1/2-YD., 9-TON

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

Gentlemen:
Send me your new H-5 Bulletin. This crane interests me for _____ work.
(type of job)

Name _____
Company _____
Title _____
Address _____
City _____ State _____

87H55C

Hydrocrane Mounts on Standard Truck

Completely new from outrigger feet to boom tip, this powerful 9-ton, ½-yd. Hydrocrane brings you work ability of heavy carrier-mounted cranes at small crane cost. Patented hydraulic outriggers permit mounting crane-excavator on a commercial motor truck, new or used, without sacrificing any basic crane working capacity.



Check these outstanding advantages---

Unmatched precision control of loads.

High-lift, three-piece boom (extra equipment at added cost) gives you 50 feet of reach, retracts hydraulically to 25 feet for travel. Boom and hydraulic fittings can be connected and machine working in less than ten minutes after arrival at job site.

12-ft. telescoping boom action — from 24 feet to 36 feet for standard two-piece boom, from 38 feet to 50 feet for high-lift boom, plus 20-ft. jib extension.

50-mph top highway speed.

Every work function fully hydraulic.

Up to 240-fpm line speed.

Available with clamshell, crane hook, magnet.

Optional remote truck control from crane cab.

Meets highway laws for over-all length and axle loads (depending on truck selection).

See it in action

Find out what the new H-5 Hydrocrane can do for you. Ask your Bucyrus-Erie distributor for a demonstration.

BUCYRUS-ERIE COMPANY
1880 South Milwaukee, Wisconsin **1955**
75 Years of Service to Men Who Shape the Earth

New truck, inexpensive used truck, a truck you now own — the new H-5 Hydrocrane can be mounted on any standard commercial truck you choose.



HEAVY LOADS



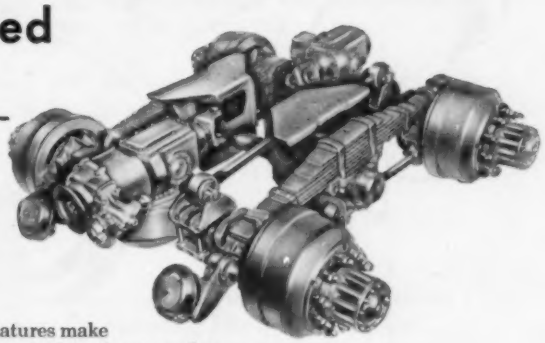
More payload with less downtime! That's the main goal of every tandem trucker . . . whether it's fast inter-city freighting . . . or rugged off-the-road hauling . . . or light-heavy cartage in and around the city.

Almost 40 years of tandem building have taught TDA the best ways to solve every tandem hauling problem. The most complete TDA family of tandems includes models that answer every need in the most economical manner. TDA tandems save payload . . . minimize downtime . . . give longer service . . . and operate with maximum economy under every condition.

ARE PAYLOADS

with TDA® tandems

...and exclusive Timken® Inter-Axle Differential that permits cab-controlled lockout at any speed...



Every heavy trucker has two big problems to lick. *First*, to deliver more payload faster. *Second*, to get the most service out of his equipment . . . with less maintenance, less downtime, and lower operating costs.

Years of TDA leadership have resulted in a tandem line that offers each trucker the most helpful answer to his special problem. In the broad TDA Tandem line, a hauler has a choice of 3 types of final drives and in a full range of capacities . . . standard units that fit his need as though they were tailor-made. But, more important than this is the quality of the TDA product . . . a marked superiority evident in such exclusive TDA features as Straight-Line Drive and Inter-Axle Differential.

Unlike ordinary tandems, in TDA Straight-Line Drive, propeller shafts form an absolutely straight line from the forward rear axle back to the rearmost axle. This permits smoother transmission of power, no noisy *around the corner operation.*

How TDA Inter-Axle Differential cuts truck and tire wear! With cab-controlled lockout! When tandem tires are mis-matched . . . or when tandem trucks are going over rough grades . . . one set of wheels must turn faster than the other. TDA Inter-Axle Differential permits any wheel to do this when necessary. Also, with TDA, the driver can, when necessary, lock out the differential and obtain a straight-through drive in mud or sand.

These features make TDA the *world's finest* tandem drive rear unit for heavy-duty motor trucks! (1) Available in 3 capacities and 3 types of final drives – hypoid-helical double-reduction, optional inter-axle differential. Worm drive, without inter-axle differential. (2) Top-mounted straight-line final drive eliminates propeller shaft angularity. (3) Optional inter-axle differential . . . spur gear design, cab-controlled power-lockout. (4) Torsion flow axle shafts . . . guaranteed for 100,000 miles or three years, whichever occurs first. (5) Hot forged steel axle housing . . . guaranteed for the life of the vehicle. (6) Unit-mounted "P" series power brakes . . . for longer life, greater economy and efficiency. (7) Cradle ride spring suspension and paralleled torque rod system . . . maintain correct alignment and weight distribution regardless of driving and braking conditions. (8) Exclusive two-piece trunnion tube bracket speeds servicing. (9) Removable torque rod and spring guide brackets . . . for positive alignment, easier replacement. (10) Rubber torque rod bushings and rubber spring seat bushings . . . eliminate metal-to-metal contact. Require no lubrication.

TIMKEN Detroit AXLES

TIMKEN DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

Accepted TDA Standard
TRADE MARK REGISTERED

World's Largest Manufacturers of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio New Castle, Pennsylvania

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. . . for more details circle 250, page 14

ONLY TDA BRAKES give all these tested advantages!



• Brake shoes made of steel save up to 40 pounds per axle . . . give strong braking action with no distortion • Patented liner shape—thickest where wear is greatest • Liners riveted on—no chance of movement on shoe • Liners circle-ground to cover all efficient braking area of shoe • Rust-proofed anchor pins locked in • First with self-aligning camshaft housings • Cam rollers heat-treated to roll smoother, wear longer • First with all-Nylon camshaft bushings • Compare similar products and prove to yourself that TDA brakes incorporate the finest quality materials, skilled workmanship and advanced design.

NO WONDER HYATTS ARE SO GOOD . . .



DISTRIBUTED BY DEALERS EVERYWHERE

A GENERAL MOTORS PRODUCT

A UNITED MOTORS LINE

there's no substitute for . . .

EACH ONE GETS OVER 50 GOIN'-OVERS!

says HY WHEELER, the sage of the socket wrench

And that's just *before* assembly, brother! The average roller gets off "easy" with only 17 inspections—the average race has to pass 41. Then at *final* inspection, every finished Hyatt gets a goin'-over that makes the third degree look like a Sunday school picnic!

That final inspection and packaging at Hyatt is as careful as for a thousand-dollar watch. Why, the girls even have their hands coated with special stuff to keep any sweat from touchin' those precious Hyatts! That's why I keep remindin' you: There's other bearings that *look* as good, but you *hold out for Hyatts in the blue and yellow box.*

HYATT ROLLER BEARINGS

STRAIGHT BARREL TAPER

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

. . . for more details circle 209, page 14

ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

Washington News Letter



By Duane L. Cronk

September 8, 1955

Around the nation, last month, editorial writers dipped their pens in purple ink and castigated Congress for failing to enact the long-hoped-for highway program that would get America out of the traffic jam.

A Roads and Streets sampling of some 200 editorials revealed far stronger sentiment than might be imagined by industry people. Few editors were temperate in their language. The great majority leveled withering blasts at a Congress that had walked away from a pressing problem.

- "The blackest mark against the record of the 84th Congress" is what the Detroit Free Press declared.
- A suburban Milwaukee newspaper called Congressmen who voted against the Eisenhower proposal "new partners in Murder, Inc. ...We think it is fair to ask how many of these lawmakers will be willing to stand and testify at the biers of thousands who will die on our inadequate highways because of their shortsightedness."
- The Hearst newspapers, which have campaigned vociferously and relentlessly for good roads during the last three years, appealed to readers to write to the President for action.
- The Muncie (Ind.) Press said of the Congressmen, "By their negative performance, they have confessed moral bankruptcy, utter irresponsibility and lack of courage. When the mess gets worse, as it surely will, the average American citizen may be minded to fix blame. He can look to those who voted this year to do nothing, and then to the men, whoever they are, whom the lawmakers say pressured them into shirking their duty."

* * * *

The prediction business has gone into receivership in Washington these days and nobody knows what will come of all this - or when - or how. Maybe the next move is one that only voters can make. Congressmen out mending political fences are particularly available just now, eager to please and susceptible to suggestion. They have been hearing from a lot of earnest people in Washington who want highways. Now they'll be hearing from angry people who matter and who are determined to get highways. The characters are the same but the scenery is different. Act III will be worth seeing.

(continued on next page)

Newspaper editors beat the state governors to the punch by only a few days in their flailing attacks on Congress. Meeting in Chicago, the Governors' Conference gave a number of chief state executives the opportunity to voice their disappointment at lack of a big federal-aid program.

"The inability of Congress to agree on a program to finance it is tragically short-sighted," Governor Walter Kohler of Wisconsin asserted.

The governors again swung their support behind the objectives of the Eisenhower proposal and again asked for federal aid more in line with what the federal government collects in highway user taxes. Construction of the National Interstate System was embraced as a primary objective.

Individually, the executives expressed as great a variation of opinion on financing the program as could be imagined. The result - no specific recommendations for Congress to consider when it meets again.

* * * *

Due to break this month - the Highway Research Board's report of report of results on the Idaho Road Test. The closely guarded findings are sure to represent another major step in highway progress. Unlike the Maryland Test Road, the Idaho Test Road was built as a research installation with sections of various thickness, and of asphalt rather than concrete.

An exciting consequence of the test, in addition to what will be learned about the effects of traffic on roads, is the advance made in instrumentation. Using what they have learned about instrumentation on the Idaho test, engineers expect to squeeze a great mass of information out of the biggest road test of all, the upcoming Illinois Test Road. An estimated half-million-dollars worth of electronic equipment will be used on that installation.

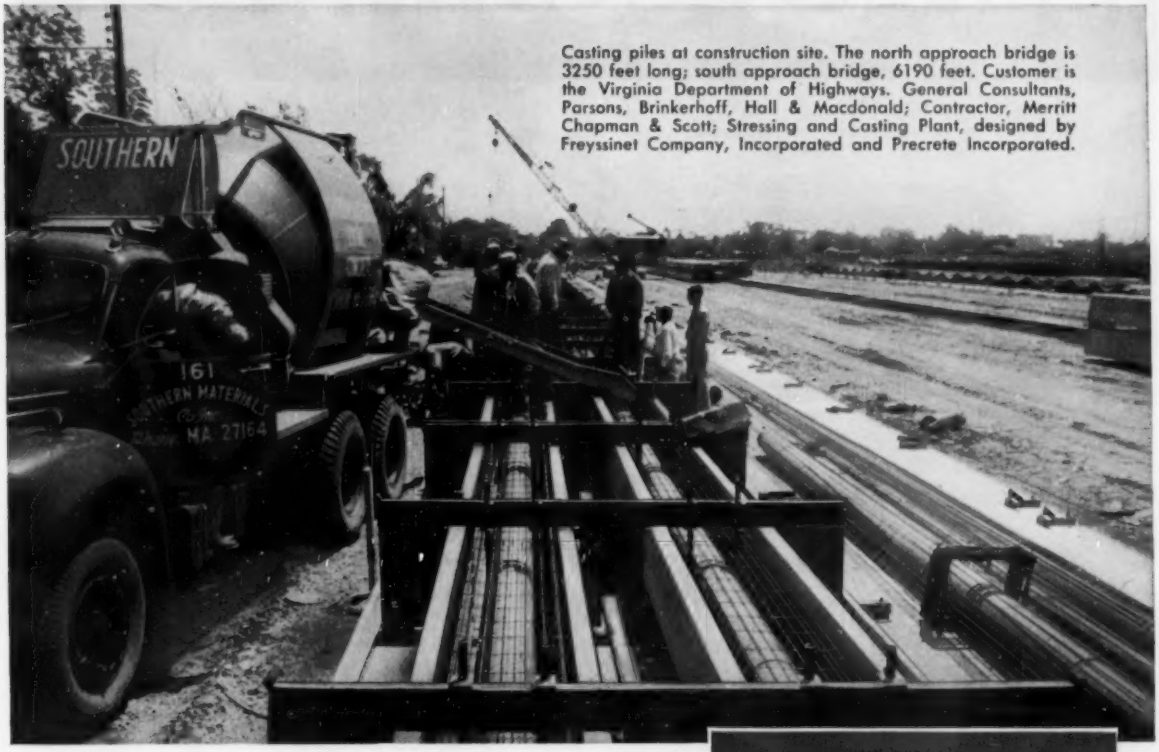
Test roads can become unnecessary, Fred Burgraff, HRB chief, believes if adequate instrumentation comes out of such projects. "If we get the right electronic devices," he said, "any road can be a test road."

* * * *

There were exceptions, of course, including the Wall Street Journal, which would still like to see the roadbuilding problem left to the states, and the Chicago Tribune, which reflected that both bills before the Congress were "bad and better off dead." The Tribune, also, advocated that Uncle Sam retreat from the highway user tax field and let the states raise their own funds for highway construction.

That so many editors were dismayed by the highway bill fiasco, however, is cause for reassurance. It indicates how deeply the need for highways has penetrated public consciousness. And it indicates how strongly the public opinion molders feel about remedial action as soon as possible.

PRESTRESSED CONCRETE
FOR HAMPTON ROADS CROSSING



Casting piles at construction site. The north approach bridge is 3250 feet long; south approach bridge, 6190 feet. Customer is the Virginia Department of Highways. General Consultants, Parsons, Brinkerhoff, Hall & Macdonald; Contractor, Merritt Chapman & Scott; Stressing and Casting Plant, designed by Freyssinet Company, Incorporated and Precrete Incorporated.

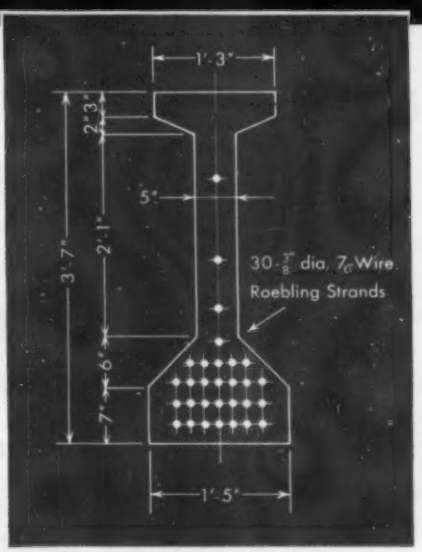
ON THE $19,500,000 bridge-tunnel project now under construction at Hampton Roads, Va., pre-tensioned bonded members are being used wherever the specification offers them as alternates to structural steel or post-tensioned members.

More than three million feet of Roebling ⅜" diameter 7-wire stress-relieved prestressed concrete strand are being used in piles and girders.

General technical data include:

Design load: H20-S16
Spans: 50'-0" c.c. pile bents
Girders: I section – 3' 7" depth at center and 3' 10" over piers on 5' 2" centers – each pretensioned with 30 Roebling ⅜" stress-relieved strands.
Piles: 24" square, 50 to 68 feet long with 10" cored hole, each pretensioned with 30 Roebling ⅜" stress-relieved strands. Five piles per bent, designed for two point pickup.

Roebling is America's leading supplier of tensioning elements, and Roebling engineers will be glad to give you full information on tensioning materials and fabrication methods. They are also ready to cooperate with you to help assure top efficiency on any specific application of this modern and economical structural material. Write Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.



Cross section of girder at center of span.

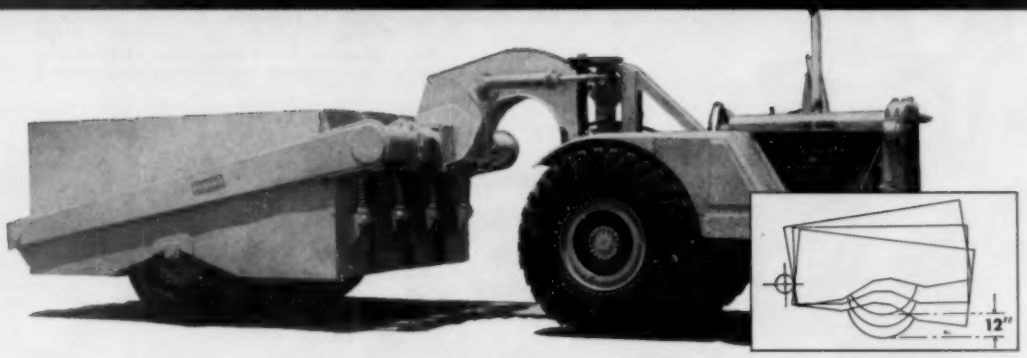
ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

. . . for more details circle 262, page 14

for compacting earthfills

SELECT SOUTHWEST



Southwest compaction roller

5 SIZES WITH WEIGHT CAPACITY FROM 10 TO 100 TONS

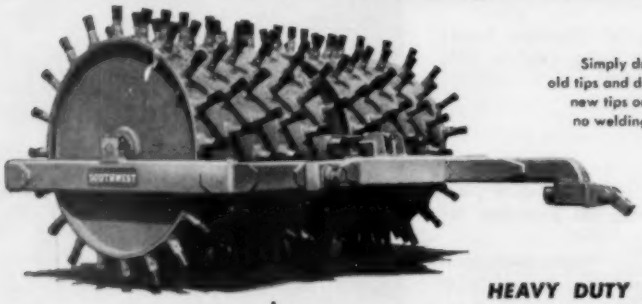


ADAPTER FLANGE permits change of draft beam to suit any tractor.

FEATURING:

1. Greater wheel oscillating freedom with each wheel mounted in an independent weight box unit.
2. Heavy duty, reinforced gooseneck and sectionalized hauling yoke.
3. Swivel hitch with Timken roller thrust bearing.
4. Each wheel equipped with two large Timken bearings.
5. Sectionalized hauling yoke permits use of 2 to 6 wheel units.

Southwest sheepsfoot roller



Simply drive off the old tips and drive on the new tips on the job—no welding required.



HEAVY DUTY MODELS FEATURING:

1. Full oscillating double drums.
2. Timken roller thrust bearing at oscillating pins.
3. Two-piece foot with replaceable tips—permits changing size or replacing tip in the field without welding.
4. One-inch steel drum shell.
5. Heavy duty, reinforced box steel frame.
6. Large swivel hitch with Timken roller thrust bearing.

11 SIZES WITH WEIGHT CAPACITIES FROM 5 TO 20 TONS

WRITE TODAY for illustrated folders giving complete data and specifications.

Southwest Welding & MANUFACTURING CO.
CONSTRUCTION MACHINERY DIVISION
ALHAMBRA, CALIFORNIA

. . . for more details circle 244, page 14

B.F.Goodrich



All-Nylon tires roll 5,000 hours on original tread, user reports

SUPPLYING a host of materials to the construction industry—from concrete and brick to crushed stone and gravel—is the job of the Consumers Co., of McCook, Ill. Trucks without springs carry 15 tons of rock over the unsurfaced road from diggings to crusher. This means the tires must take all the shock.

B. F. Goodrich *all-nylon* tires do the job, Consumers Co. reports. They give up to 5,000 hours of service, and are 50% less susceptible to tire-killing, production-stopping blowouts.

How nylon saves you money

Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. That's why the B. F. Goodrich *all-nylon* tire body outwears even its extra-thick tread, can be recapped over and over! You get more original hours of service, more hours of service per recap.

Your B. F. Goodrich retailer has a complete line of *all-nylon* off-the-road tires. Find out from him how you can save money, no matter what kind of work you do. His address is listed under Tires in the Yellow Pages of your telephone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*



ALL-NYLON Rock Logger and Universal tires under 15-ton load on the way to the rock crusher.

. . . for more details circle 211, page 14



CONSUMERS trucks travel up steep ¾-mile road from diggings. *All-nylon* tires resist bruising and sidewall scuffing.

Specify B. F. Goodrich tires when ordering new equipment

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER



FAST PRODUCTION TEAM *for off-road hauling . .*

You get high-speed production on both excavating and hauling, when you team Koehring fast-shuttling Dumptors with Koehring heavy-duty shovels. Notice on the operation shown here how Dumptor spots in close under the Koehring ¾-yard 304 — keeps shovel swing short. Square body opening provides a big, easy-loading target — can be loaded over either end or side.

Shuttling back and forth between the shovel and the dump area, Dumptor travels round trip without turning. Constant-mesh transmission gives the same travel speeds in either direction — saves at least 2 slow turns on every haul cycle. This heavy-duty 6-yard hauler has better than 6 h. p. per ton of loaded weight — accelerates fast, pulls through soft ground and up grades with less shifting, climbs 24% grades fully loaded. One-second gravity dumping also saves time on every cycle. There's no 15 to 25-second wait for slow-acting hydraulic or electric body hoists — no expensive body hoist maintenance. What's more, gravity-dump never balks, never wears out.

Now, take a quick look at the other half of this heavy-duty team — the Koehring ¾-yard shovel. Its powerful digging crowd and fast swing are backed up by plenty of weight-stability to hold solidly to the grade. Automatic take-up and release of tension on the crowd chain assure maximum dig-in power at every boom angle. For all its powerful application, Koehring 304 booster clutch requires only ⅓ to ½ the lever pull of a straight manual clutch — yet retains accurate "feel" of load. Instantaneous dipper



QUICK FACTS ABOUT 304 WORK CAPACITY

As a heavy-duty shovel or hoe, this Koehring 304 has ¾-yard dipper capacity — 13.9-ton lift capacity as a crawler crane — 25-ton lift capacity on rubber-tired truck or cruiser mounting — readily converts to clamshell, dragline, pile driver.

. . heavy-duty digging

trip that works *every time* is another of many Koehring features that step up shovel cycles, and give you more production every shift.

Consider what this combination of Koehring excavators and Koehring Dumptors can mean to you in overall operating efficiency, economy — and in time-saving convenience when you standardize on *one make* of equipment for all of your excavating and hauling. Get more information on Dumptors® and on the 5 sizes of Koehring heavy-duty excavators from your Koehring distributor today — or send for catalogs.

KOEHRING COMPANY

Milwaukee 16, Wisconsin

Subsidiaries: PARSONS KWIK-MIX • JOHNSON

KS39

. . . for more details circle 222, page 14

Southern Tire Retreads
Equal Original Mileage
Cut Tire Costs
40% or more!





Superior three-sectional molds enable Southern Tire Company to retread any tire, regardless of growth, without buffing to the breaker strips. This, plus use of the finest rubber made, assures a retread that will equal the mileage of the brand new tire—at a saving of 40% or more!

NO EQUIPMENT DOWNTIME

Your tires will be picked up at your job site after work hours and replaced with spares. Retreads will be replaced after work hours, so there's no costly equipment downtime in the whole operation.

CHOICE OF ROCK SERVICE, TRACTION TYPES, OR RIB TREADS TO SUIT YOUR PARTICULAR JOB.

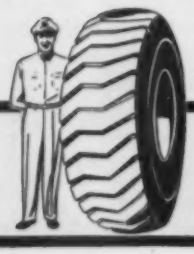
ALL SIZES from 1100x24 to 2700x33 also new sizes 29.5x25 and 29.5x29.

Call Your Favorite Dealer and Specify Southern Retreads.

Lugs of all Southern Retreads have as much rubber as a new tire, and more undertread than any rock service tire.

Southern Tire Company is one of the nation's oldest large tire retreaders, with more retreads to its credit than any other company.

AMERICAN ROAD BUILDERS' ASSN. 1902 — ALABAMA ROAD BUILDERS ASSOCIATION INC. 1947



SOUTHERN TIRE COMPANY

312 - 316 S. COURT STREET
FLORENCE, ALA.

PHONE COLLECT
Florence
85 or 86

. . . for more details circle 267, page 14

For Better Ice and Snow Control Next Winter...

A PLAN OF ACTION NOW!

ORDER YOUR STERLING ROCK SALT EARLY AND PLAN ITS DISTRIBUTION TO STRATEGIC STORAGE POINTS

Salt Storage NOW is the Key to Storm Strategy LATER!

THE BIG COST VARIABLE in your budget is for man-hours of crews and equipment. If, under emergency conditions, they must haul salt cross-town or cross-country to get it to where it's needed—your costs go up.

Sterling Rock Salt . . . ordered now . . . and distributed to your key pick-up points in advance . . . avoids costly waste motion of crews when the storms come. Your men and machines are a striking force . . . not a supply train.

And don't worry about storage losses, either. The free booklet, offered below, shows many ways Sterling Rock Salt can be stored easily, safely and economically . . . indoors or outdoors . . . without loss.



Save money by using trucks and crews in slack periods during the next month or so to place Sterling Rock Salt under protective covering at key locations . . . *where* you want it *when* you'll need it.



When storms hit, streets and roads are cleared promptly. No last minute confusion. No duplication of effort—or of costs in transporting and handling rock salt. It's already there, where it's needed—according to *plan!*

Avoid Last-Minute Confusion! Save Money!

ORDER YOUR STERLING AUGER-ACTION ROCK SALT NOW!

INTERNATIONAL SALT COMPANY, INC.
Scranton, Pennsylvania
SALES OFFICES:
Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. Detroit, Mich. • St. Louis, Mo. • Newark, N. J. • Buffalo, N. Y. • New York, N. Y. Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.

Send for FREE Booklet,
"HOW TO PROVIDE LOW-COST ROCK SALT STORAGE"
11 ways to store safely, economically—indoors or outdoors.

. . . for more details circle 219, page 14



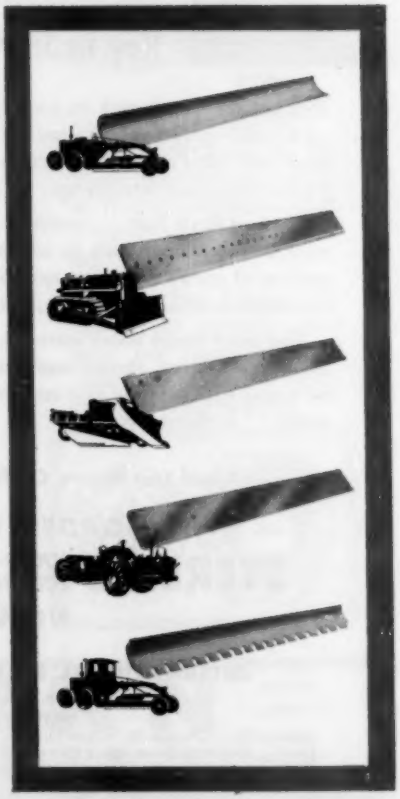


LEPRECHAUNS or BLUE OXEN?

Many remarkable tales about construction miracles came out of the early days of the West. Like the ways Leprechauns helped Irish workers build our transcontinental railroads. Or the way Paul Bunyan used his big blue ox, Babe, to turn Kansas under, "a square-mile at a time."

Of course, no man could verify these tales. But there are many men who'll tell you *from first hand experience* about the ways CF&I Cutting Edges help modern contractors. They'll tell you about the extra-rugged and long-lived service that CF&I Cutting Edges give on dozers, scrapers, graders, snow plows and allied equipment, and that's no miracle.

You'll find that CF&I Cutting Edges are supplied in a wide variety of lengths, widths, thicknesses and hole spacings—flat or curved—with beveled or square ends. For full details, contact your nearest CF&I Representative.



CF&I

3183 CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

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San Francisco • Seattle • Spokane • Wichita

. . . for more details circle 264, page 14

Most Effective Compaction With Fewest Passes.....

A 3-axle tandem roller, with a variable weight range from 14 tons (metal weight) to 20 tons fully ballasted with water, is now being built by GALION. In addition to the main compression or drive roll, it has twin guide rolls with synchronized hydraulic steering. You get up to 50% smoother finish rolling than with conventional tandems, and up to 60% greater tonnage of material can be compacted per day. You get faster and better compaction of joints and seams. Elimination of cross-rolling saves you time and money.





ROLL-O-MATIC *Torque Converter* DRIVE . . . is STANDARD EQUIPMENT

TRANSFER OF WEIGHT PRINCIPLE

With the three rolls of the GALION 3-axle tandem roller operating on a plane, an effective transfer of weight occurs whenever one of the rolls hits a high spot in the surface being rolled. When this takes place, only two of the rolls are in contact with the surface. Therefore, the weight of the third roll transfers to the other two, thus bringing more compaction weight to bear on the high spot. This feature accounts for the extremely high compaction efficiency of the Galion 3-axle tandem roller.

GALION gives you the most effective and economical driving power obtainable. The ROLL-O-MATIC Torque Converter (GM - Allison) Drive differs from a fluid coupling drive. A fluid coupling transmission requires a manual gear shift mechanism, and the fluid coupling itself never multiplies engine power.

The Galion ROLL-O-MATIC Torque Converter Drive has no gear shift mechanism. Furthermore, it automatically MULTIPLIES the engine driving force by means of oil in motion instead of by transmission gears. It automatically APPLIES the driving force as the work demands, and closely MAINTAINS desired rolling speed regardless of grade or working conditions. This desired rolling speed is closely and automatically maintained whether working up hill, down hill, or on the level. Reversing action is velvet-smooth; shock loads are eliminated.

MORE EFFECTIVE COMPACTION WITH BETTER FINISHING



On level surfaces all rolls compact and finish.



With drive roll on high spot, weight of center guide roll transfers to other two rolls.



With center guide roll on high spot, all weight of end guide roll and part of compression roll weight transfers to center guide roll.



With rear guide roll on high spot, weight of center roll transfers to other two rolls.

EYE-OPENING RESULTS

The Galion ROLL-O-MATIC Torque Converter Drive saves up to 25% in fuel, engine life is increased 35% and life of forward-reverse clutches 40-50%. Elimination of master clutch, gear shifting, and shock loads results in unequaled ease of operation. Rolling speeds from .8 to 5.5 m.p.h. are available. Engine braking power on downhill grades is smooth and effective.

For complete information, fill in and return the coupon.

Please send me literature on the Galion Rollers checked.

- ☐ 3-AXLE TANDEM
- ☐ 2-AXLE TANDEM
- ☐ THREE-WHEEL
- ☐ PORTABLE
- ☐ TRENCH

THE GALION IRON WORKS & MFG. CO., Dept. RS-95 Galion, Ohio, U.S.A.

PERSON_____

FIRM_____

STREET_____

CITY_____ STATE_____

. . . for more details circle 206, page 14



Dozing hard sandstone in stripping and building access roads keeps two HD-21's busy at the Peerless Mine of Coal River Mining Company, Hookersville, W. Va. The HD-21's are working 16 hours a day, 7 days a week, moving up to 1,500 yd of material like this in each 8-hour shift.

new HD-21's AT WORK across the country

Allis-Chalmers HD-21's are meeting today's stepped-up demands on hundreds of jobs



Excavating and leveling land for an outdoor theater near Milwaukee was the first assignment for this HD-21. Kramp Construction Company was the first Wisconsin owner of one of these productive new tractors.



Push-loading scrapers is another of many uses for the HD-21. The torque converter drive automatically selects the speed and power necessary to help scrapers pick up a full load. Contractors Machinery Company, subsidiary of Grannis and Sloan, Fayetteville, N. C., is using this HD-21 for extending aircraft runways at Pope Field, Ft. Bragg, N. C.

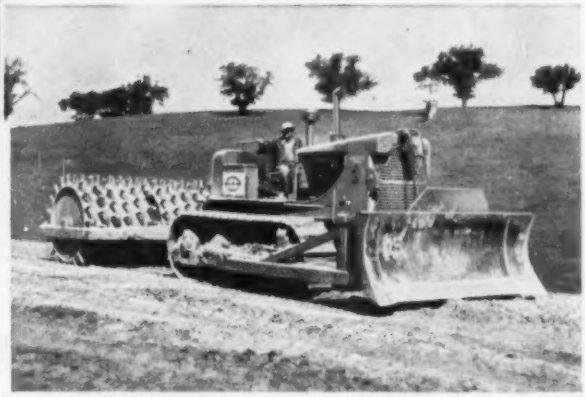


Clearing, dozing and cleaning up around a 3-yd shovel . . . that's how Badget Mine Stripping Company uses its two HD-21 Allis-Chalmers Tractors. The units are working on the northeast extension to the Pennsylvania Turnpike in the Pocono Section near Wilkes-Barre, Pa.

New Allis-Chalmers tractors with advanced basic design features, job-proved during millions of operating hours, are going to work in your neighborhood. Ask your Allis-Chalmers dealer where you can see them in action.



Big dirt mover on the new Kenwood Plaza Shopping Center, Kenwood, Ohio (Cincinnati suburb), is this 44,000-lb HD-21. The contractor, John R. Jurgensen Company, will move an estimated 250,000 yd before the job is finished.



Pulling, pushing and dozing, two HD-21's owned by Ransome Company, Emeryville, Calif., are busy on the 4.4-mile, all-new Ygnacio Valley Road extension job in Contra Costa County, Calif.

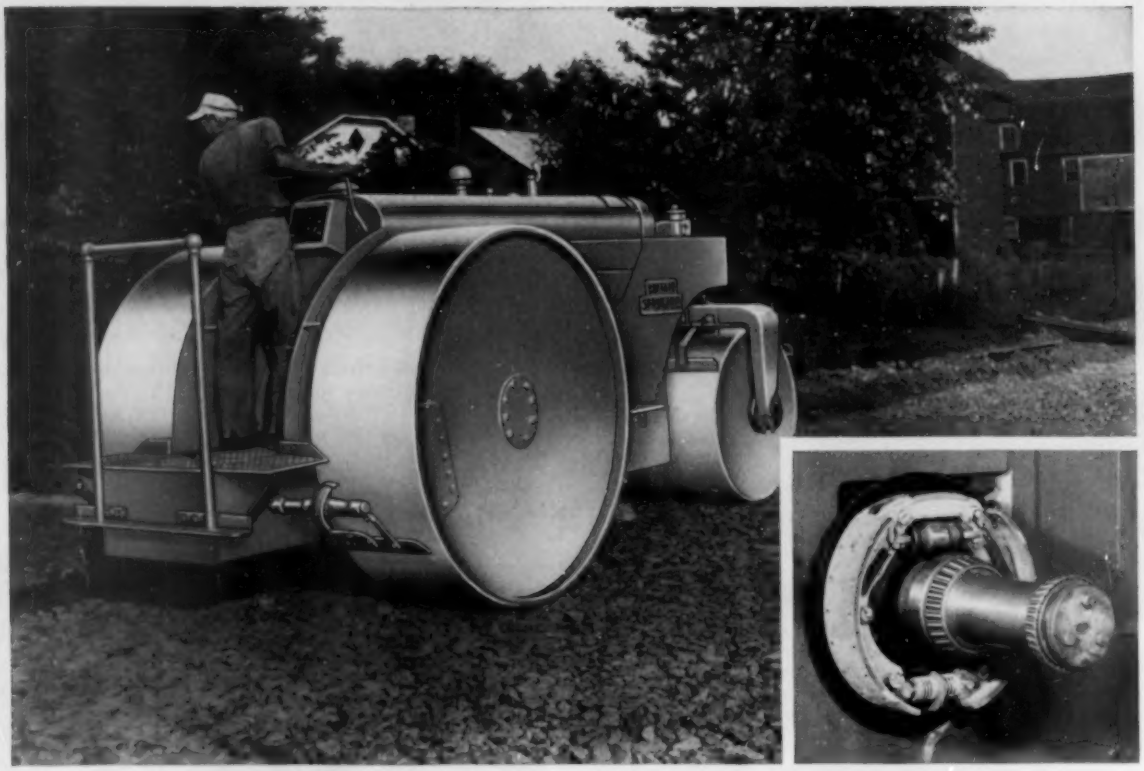


Big jobs need big equipment and some of the biggest producers on the Indiana Turnpike are the many HD-21 tractors at work there. Here one of the 204-hp giants pulls a loader on a stretch for which Rieth-Riley Construction Co., Inc. is the prime contractor and Chapin & Chapin, Inc. the sub-contractor.

ALLIS-CHALMERS

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

. . . for more details circle 178, page 14



NEW Buffalo-Springfield EXCLUSIVE!

. . . POWER ROLL BRAKES

plus TAPERED ROLLER BEARINGS ON ALL ROLLS

Here is another example of the kind of outstanding leadership in design and engineering that really means something to *you!* It is the type of advanced engineering that throughout the past has given you so many superior performance features . . . and now brings you these latest Buffalo-Springfield exclusives as STANDARD EQUIPMENT on all 10-14 and 12-15 ton 3-wheel rollers.

The vacuum hydraulic powered brakes on both drive rolls, and a mechanical parking brake mounted on the transmission, provide complete and positive braking control at all times and under all conditions. The tapered roller bearings on both the guide and drive rolls provide true rolling motion, easy adjustment and minimum maintenance.

In addition to these latest unmatched engineering advancements you still get, at no extra cost, your choice of Buffalo-Springfield's time-and-field-tested 4-speed transmission or torque converter drive; special torque-proportioning bevel gear differential; high-speed, low-torque clutches; improved hydraulic steering system for easier, smoother, more accurate, closer rolling.

Get the complete story on these new pace-setters today . . . preferred-performers tomorrow . . . from your nearest distributor.

BUFFALO ROLLER COMPANY — **SPRINGFIELD** SPRINGFIELD, OHIO, U. S. A.

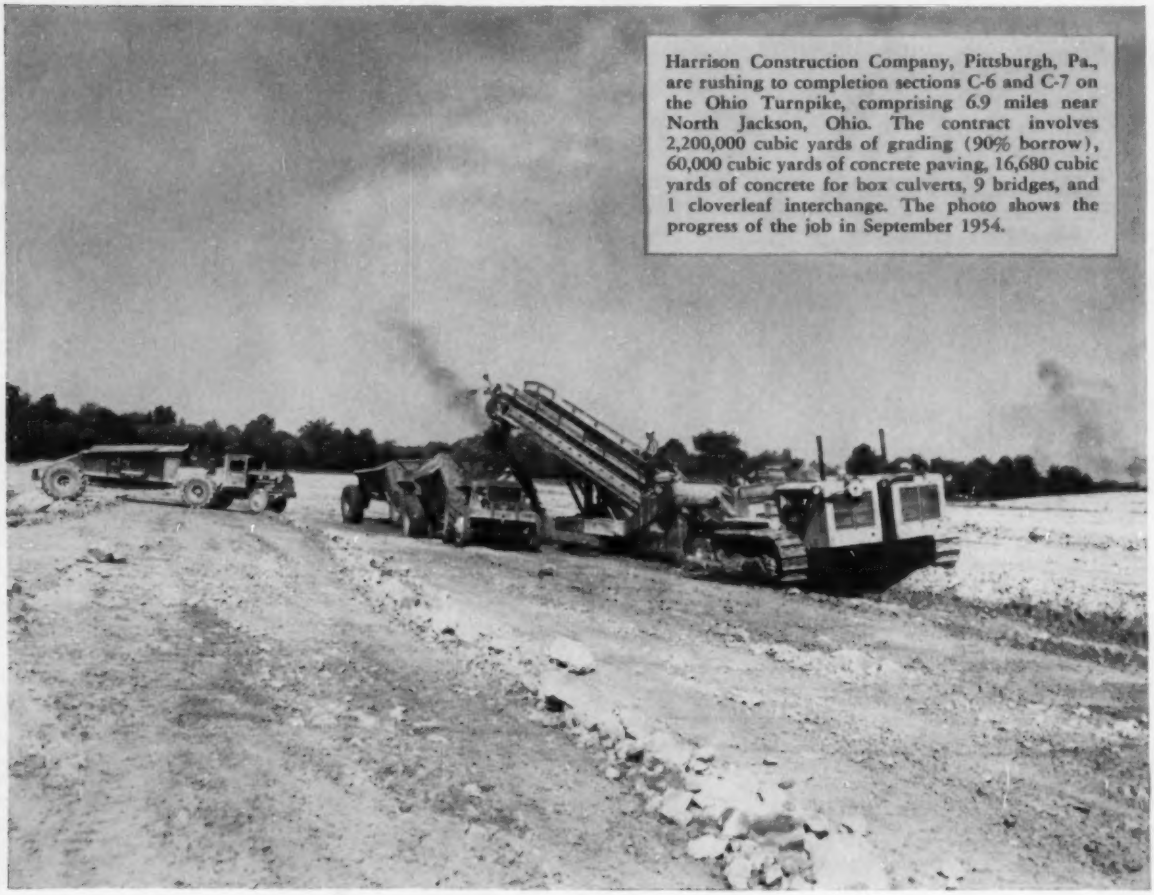
THE LEADER IN COMPACTION EQUIPMENT DESIGN AND MANUFACTURE

. . . for more details circle 187, page 14

GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling

on the Ohio Turnpike Project



Harrison Construction Company, Pittsburgh, Pa., are rushing to completion sections C-6 and C-7 on the Ohio Turnpike, comprising 6.9 miles near North Jackson, Ohio. The contract involves 2,200,000 cubic yards of grading (90% borrow), 60,000 cubic yards of concrete paving, 16,680 cubic yards of concrete for box culverts, 9 bridges, and 1 cloverleaf interchange. The photo shows the progress of the job in September 1954.

THE Ohio Turnpike is another big and important project where a large percentage of the participating contractors rely on Gulf to keep their equipment on the job and operating smoothly.

Contractors like Harrison Construction Company, for example, appreciate the clean-burning, high performance properties of Gulf gasoline and Diesel fuels—also Gulf's prompt delivery service.

Let us discuss with you how Gulf's quality service and fine products can help you on your next job. They are quickly available to you through more than 1400 warehouses located in 31 states from Maine to New Mexico.

GULF OIL CORPORATION
1822 Gulf Building

GULF

GULF REFINING COMPANY
Pittsburgh 30, Pa.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

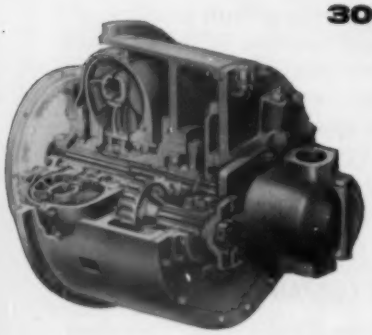
. . . for more details circle 213, page 14

Faster... more power... better traction

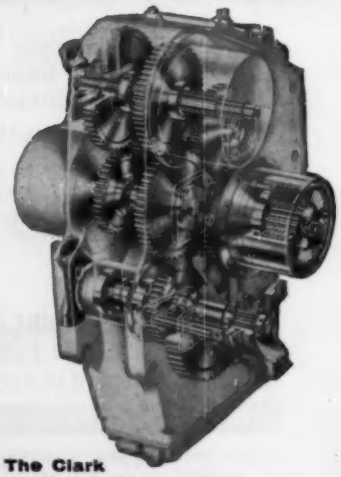


300% torque multiplication when you need it

1. You get 3-to-1 torque multiplication automatically when the going is toughest—smooth power, maximum traction.
2. You can't stall the engine—instead you get full power on the bucket cutting edge.
3. No clutch—eliminates the chief cause of operator fatigue and maintenance problems.



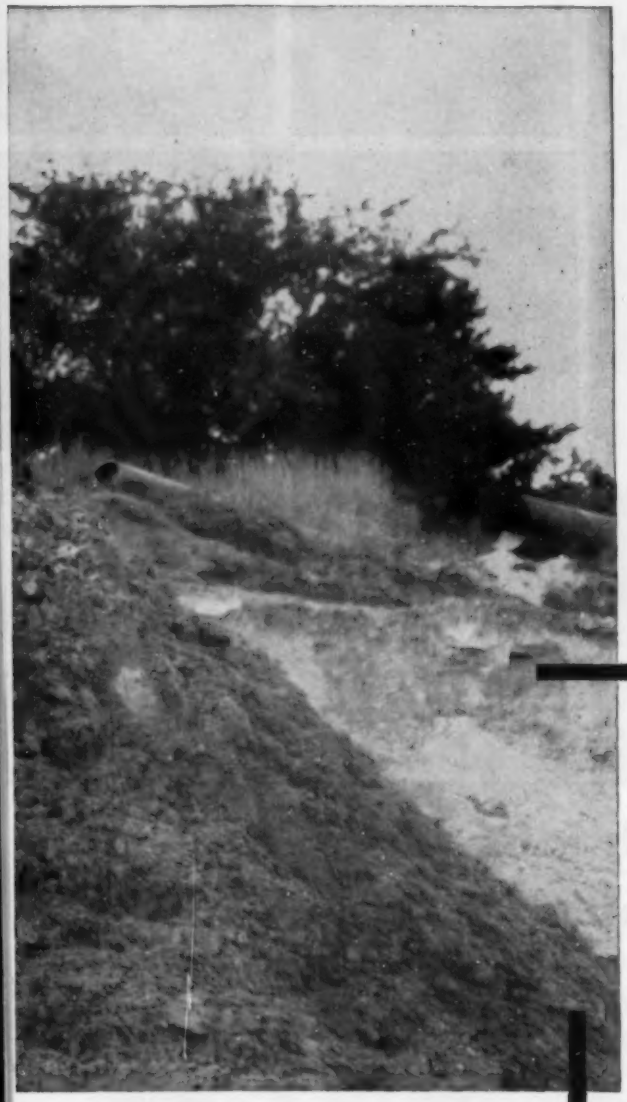
The Clark Torque Converter



The Clark Power-Shift Transmission

From engine to tires, the MICHIGAN power train has been engineered for superior tractor shovel service. For complete details and cutaway drawings, write for Tractor Shovel Broadside.

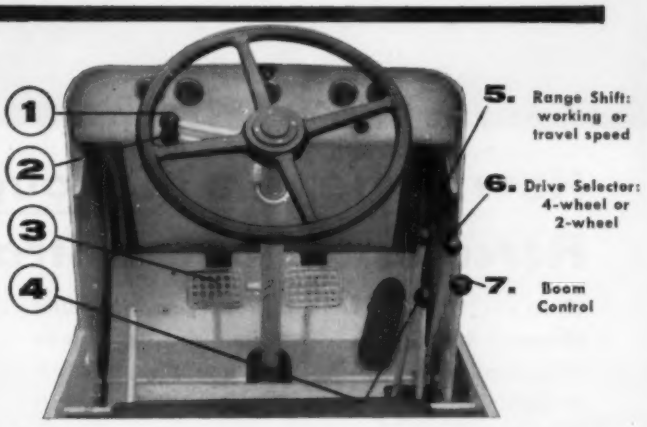
—and LOOK, NO CLUTCH!



Until you see a MICHIGAN® in action, you won't believe that a tractor shovel can deliver so much power and traction *with such ease of operation!* There's no clutch pedal on a MICHIGAN—it's as simple to drive as a brand-new car. And having eliminated the engine clutch, the MICHIGAN eliminates the most notorious cause of driver fatigue and excessive maintenance cost.

The MICHIGAN's remarkable ease of operation saves time in every cycle, adds up to more yardage per hour. The operator stays at peak efficiency because he doesn't have to fight a heavy-duty clutch all day.

To really recognize the superiority of this machine, all you have to do is see it in action. It's easily arranged, without obligation—write us for a demonstration. And MICHIGAN Tractor Shovels are available under a low cost Leasing Plan—glad to send you full details.



Hydraulic power does the shifting

1. Gears in constant mesh—no gear clash, noise or wear.
2. 4 speeds forward and reverse, up to 27 mph in both directions.
3. Oil re-circulated by pump lubricates entire transmission.
4. Power-shift levers on steering column actuate transmission control valves.
5. To put full power on the bucket, just step on the brake—you automatically put the transmission in neutral.

. . . for more details circle 191, page 14

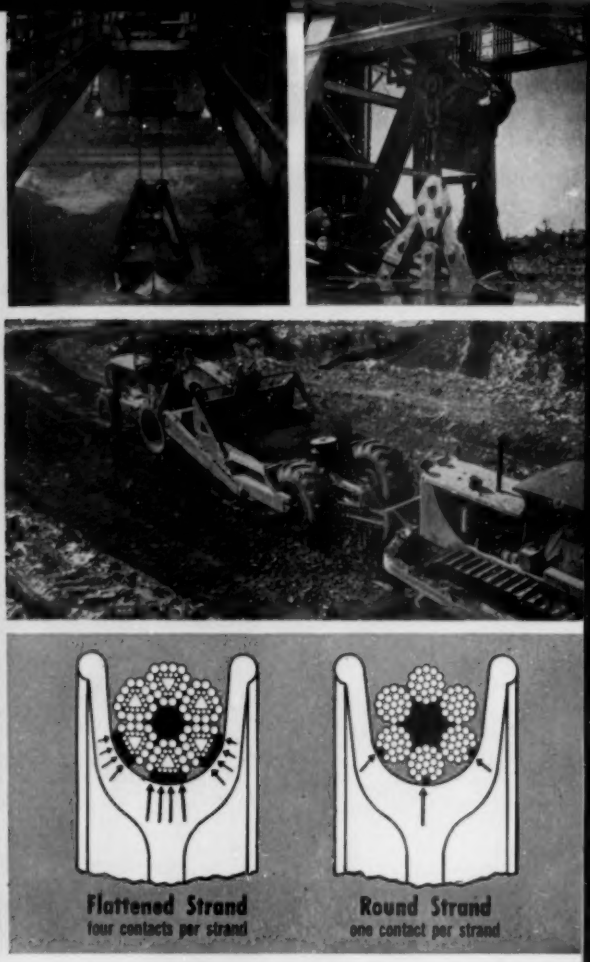
It's a pleasure to work here!

1. **Forward and Reverse:** easy hand-lever on steering column; make either shift while moving in either direction.
2. **High and Low Speeds:** another easy hand lever.
3. **That's no clutch!** It's a double-pedal brake, use it with either foot.
4. **Break-out bucket action:** work the bucket in the pile—you've got 2 double acting bucket cylinders for tremendous break-out power, independent low-level tip back action.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
394 Second St., Benton Harbor 28, Michigan
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How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

LESCHEN

HERCULES *Red-Strand*® WIRE ROPE

LESCHEN WIRE ROPE

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

HKP

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

. . . for more details circle 225, page 14

Vibration Recorder Helps Contractor

Plan Safer Blasting

"Accelerograph" device proves its merits in test on Massachusetts Turnpike, as aid in planning and checking blasts under close-quarter conditions.

Special to Roads and Streets

PUBLIC damage and liability claims have long been a headache and expense on highway and other construction involving blasting. Blasting has become a major safety problem particularly on modern superroads through suburban areas, where the necessary rock shooting for heavy grading frightens home owners and makes them fear for their property.

An instrument designed to help check on ground vibration caused by blasting and determine safe blasting procedures was used this past summer on a contract section of the Massachusetts Turnpike, held by Rock Construction Company of New York City. The instrument is one which has undergone development and testing in the last few years by Liberty Mutual Insurance Company. Its purpose is to help contractors cut liabili-



● The test blast itself. A blast typical of innumerable shots being required today in excavating for modern super-highways. (See Drawing 1 for details.)



● (Left): Liberty Mutual engineer A. L. Merrill explaining accelerograph to William Dunham of Rock Construction Company. (Right) Data being taken as blast holes are loaded for the test shot.

ty claims and thus hold down insurance costs.

The instrument is a ground-vibration recording "accelerograph" valued at about $2,000. The blast shot here pictured is part of the test involving the instrument on Rock Construction's 4-mile turnpike section near Brimfield, Massachusetts. This section requires blasting at various locations within 200 ft. of adjacent homes and structures. The purpose of the test was to provide data, derived from the accelerograph, whereby blasting could be scientifically planned to be within safe limits along the highway route.

After a good deal of previous field testing, Liberty Mutual engineers have worked out a blasting formula which, when used in connection with the information supplied by the accelerograph, provides the contractor with a working guide for keeping his shots within safe limits. The basic formula is as follows:

$$\left(\frac{50}{D}\right)^2 C^e K = ER$$

Where D = Distance in feet to nearest building
C = Pounds of explosive per typical delay
K = Ground transmission factor
ER = Energy ratio

"ER," or the energy ratio, represents the potentially destructive force of the blast, and "K," or the ground transmission factor, represents the peculiar nature of the rock and earth which determines the size and speed of the shock valves that will be sent out by the blast.

"ER" should not work out, say Liberty engineers, to more than 3.0 for the protection of normally constructed buildings. And if nearby structures are prestressed or poorly built, the ER should be considerably lower.

"K" of course varies from location to location, depending upon the nature of the earth and rock in the blasting area. A certain quantity of explosive which could be safely used in one area can be very dangerous and destructive in another, due to a variance in this ground transmission factor. The determination of this ground

Accelerograph Blasting Vibration Test

Massachusetts Turnpike Contract Section 51-050, June 29, 1955

OBJECTIVE:

To determine the dynamic effect of the ground vibrations produced by blasting operations at this new road location. Also to evaluate the degree of exposure to nearby structures and check the possibilities of causing damage to them.

To establish the safe amount of dynamite to be used at this job location in order to prevent damage.

PROCEDURE:

This company has a subcontract for blasting ledge rock along this new road location. The rock is hard and is being shot out for the full widths of the roadway.

The test shot on this date was located between Station 826 + 00 to 826 + 50 and it included about 3,000 cu. yd. of rock blasted with 1,705 lb. of 40% and 60% dynamite in 44 holes. These holes were 4½ in. diameter, 8 ft. on center, 16 ft. deep, all well tamped. The blast was fired with an instantaneous cap and three short period delays. Drawing No. 1 shows the blasting data and the vibration test layout.

The vibration recording machine was set on the ground surface at a distance of about 400 ft. from the blast area. The tests were made with a three-plane accelerograph and the vibration recorded on a 70 mm. film.

FINDINGS:

Figure A shows the film record of the blast.

Computations of the energy ratios developed for each dynamite charge and delay were made and the resultant values plotted. All energy ratios were within the safe zone and were less than the recommended safe limit of 3.0.

In order to determine the safe ground transmission factor "K," an envelope curve was plotted and the value determined was K = .00015.

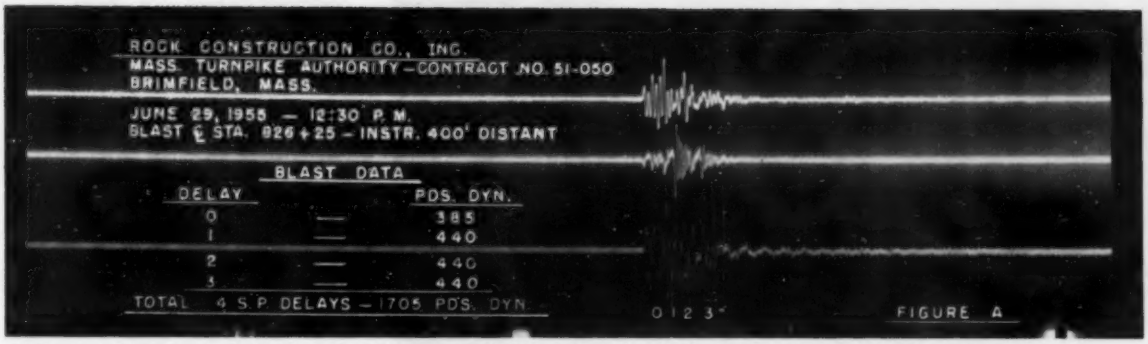
CONCLUSION:

(As reported by Arthur Gordon, Assistant Chief Engineer, Liberty Mutual Insurance Co.).

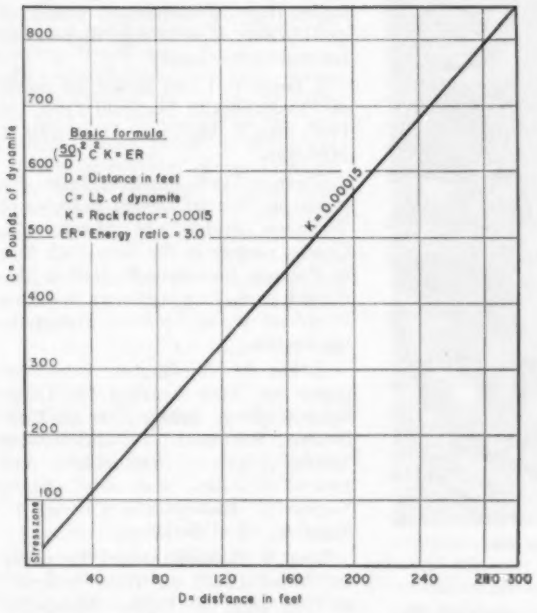
The ground vibrations produced by blasting may create a dynamic effect sufficient to cause damage to nearby structures. In order to avoid this possibility and to control the effect, it has been determined that an energy ratio of 3.0 be used as a safe limit. Under this limit, the weakest structural materials such as plaster in good condition and not prestressed will not be damaged.

As stated previously, the results of the test indicated that all the test blasting on this date was within a safe limit. There was not any possibility of causing damage from the amounts of dynamite used.

We have plotted on Chart "B" the safe amount of dynamite vs. distance from buildings based on the computed ground transmission factor determined here. This amount of dynamite per delay would be a safe guide to control the blasting effect. If the rock characteristics at this location changes, it will be advisable to take additional tests.



● Figure A. Photograph of the blast recording — part of the test here described on Massachusetts Turnpike project.



● Chart B. Safe amounts of explosive per delay vs. distance of building from shot, as determined by the test.

factor, K, is the primary work of the accelerograph. Once this factor has been determined for a given area, and the nature of the structures in the area assessed, then an accurate formula can be set up for determining exactly the maximum pounds of blasting materials which can be safely shot at various distances from the structures.

How Instrument Works

The accelerograph has in it three reeds, set at right angles to each other, which are activated by the blast vibrations. Small concave mirrors are attached to each of the reeds, and as the reeds vibrate, the mirrors pick up a source of light and reflect the pattern of reed vibration onto a moving 70 mm film. Thus the film record is already an analysis of the blast tremors into three different planes, vertical, transverse, and longitudinal.

A reproduction of the accelerograph film record made at the Brimfield test site is shown on these pages. From this film record, Liberty engineers computed the ground transmission factor, which came out at 0.00015, based in this instance on the use of Hercules Gelamite No. 1.

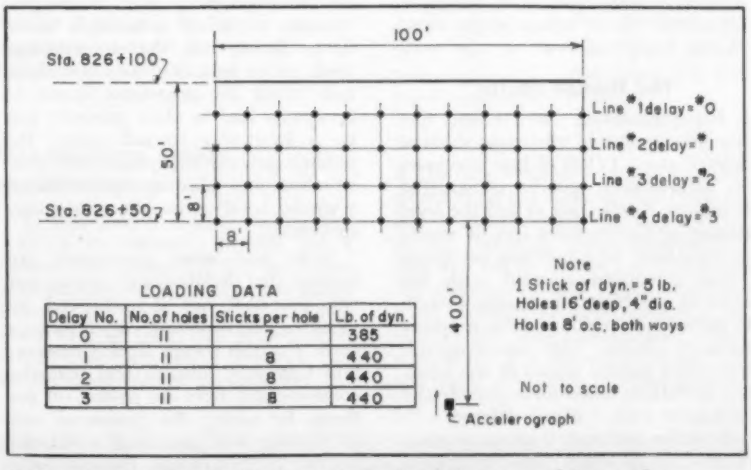
With the K factor determined, an easy-to-read graph (see accompanying chart reproduction) can be prepared showing safe quantities of explosive usable at various distances from any building in the area. For example, the chart shows that Rock Construction can — for this ground condition — safely set off 200 lb. of dynamite in any one of its delays at a distance of 70 ft. from nearby buildings.

If there is a marked change in the rock structure, which is unlikely, then another test to determine the new ground factor is recommended in the insurer's report.

The accelerograph appears to take the guesswork out of critical blasting, and thus assures the contractor that he is not endangering nearby structures.

It also thus provides him with a scientific defense against the false claims which seem to be a part of any blasting operation.

The accelerograph is a recognized and reputable instrument which can play an impressive role in any lawsuit, provided only that the contractor follow the recommendations set up on the basis of material derived from



LOADING DATA

Delay No.	No. of holes	Sticks per hole	Lb. of dyn.
0	11	7	385
1	11	8	440
2	11	8	440
3	11	8	440

● Drawing 1. Layout of vibration test, showing hole pattern, delays used, and other details of the shot.



● Rotary drills (Joy Challenger, 4½ in.) putting down the holes for the test blast.

it. For this reason Liberty recommends that the contractor keep a log on critical blasting operations, specifying the number of holes, delay pattern, type and quantity of dynamite, etc., for ready reference in the event of any liability claims.

The Human Factor

Experimentation has shown that human response to vibrations starts at a level about 1/100 of that necessary to injure even poorly constructed buildings. A vibration at 1/5 the level damaging to structures can be severe and startling to a building occupant. These vibrations coupled with the noise of the blast are usually enough to provoke a wealth of false property damage claims. The accelerograph test and a careful record of the blasting operations based on it provide the contractor with a sound defense.

In order to forestall as many complaints as possible, the insurance company engineers suggest that the contractor inform occupants of the blast times, have them remove or secure objects on open shelves, and open windows to minimize the concussion effect of the blast. These precautions are taken, not simply to reduce claims, but also to establish good public relations. Any consideration which the contractor shows to occupants and to their property can go a long way toward easing the public's general annoyance with construction and blasting operations as a whole, notes an insurance company spokesman.

More and more contractors are finding that liability suits mean not only time lost, but, if unchecked, an eventual skyrocketing of insurance costs. For this reason Rock Construction Company officials feel that the accelerograph tests are paying off for them. By taking the guesswork out of blasting and providing a defense against liability claims, the insurance company is also holding down the contractor's insurance rates — a saving that can mean the difference between winning or losing the next contract.

ASCE presents awards for outstanding papers

Highway subjects were prominent among the technical papers of outstanding merit, singled out recently for awards by the American Society of Civil Engineers. To be presented at the Society's annual meeting in New York City, October 26, the awards include the following:

Norman Medal, for paper on "Anchored Bulkheads," to Dr. Karl Tersaghi, Harvard University, holder of an Honorary Membership, highest distinction in the Society.

J. James R. Croes Medal, for paper on "Mechanics of Manifold Flow," to Prof. John S. McNown, University of Michigan.

Thomas Fitch Rowland Prize, for paper on "Special Design Features of Yorktown Bridge," to Maurice N. Quade, partner in the New York firm of Parsons, Brinckerhoff, Hall & Mcdonald, consulting engineers, and Past President of the Society's Metropolitan Section.

Arthur M. Wellington Prize, for paper on "Live Loading for Long-Span Highway Bridges," to six Californians: Raymond J. Ivy and Stewart Mitchell, both of Sacramento, and Prof. T. Y. Lin, Norman C. Raab, Vernon J. Richey and Charles F. Scheffey, all of Berkeley.

Leon S. Moisseiff Award, for paper on "Wind Loads on Truss Bridges," to Prof. John M. Biggs, Massachusetts Institute of Technology.

Additional awards and medals and also two fellowships were given for other papers in various civil engineering fields.

$110,000 damages for boy struck by cement truck

Indicating the money, as well as personal hazard involved in construction accidents, a settlement of $110,000 damages was one from the Central Engineering Company of Rock Island, Illinois, for an accident suffered by a 12-year-old boy.

The boy was watching a cement mixer and finishing machine which was widening a street near his school. A truck backed up and ran over him, resulting in a broken hip and leg and other fractures and injuries. The suit brought negligence charges against the contractor. The case was settled in a pre-trial conference.

EDITORIAL

SOME PROBLEMS CAN'T WAIT FOR TEST ROADS

THE entire highway profession is watching with much interest the crystallization of plans for the big full-scale test road project in Illinois. Inevitably, it will bring far-reaching results and will throw new light on conclusions reached on the recent Idaho test road and previously on the controversial MD-1 project in Maryland.

A testing engineer of our acquaintance, highly regarded in state highway circles, has set us to wondering what the rank-and-filers among highway engineers are thinking on the value of these big test projects in the engineer's individual and localized problems.

For one thing, he feels that test roads may tend to put off the day when individual decisions are made regarding road design in the various states. Sensible answers are needed *now* on road design problems involving hundreds of millions of dollars in the current year and on 1956 projects.

A common point of view is that, while a test road will provide invaluable information on the relationships between load, road and subgrade for a particular locale, the findings won't help the engineers in other states. It is hoped that the test road in Illinois will develop conclusions which are so basic that any engineer anywhere who has an open mind can devise methods of interpreting these findings and applying them to his own area. It would seem in passing that these interpretation factors should also be reduced to formula.

Then there is the lurking fear that someone in the Bureau will one day take test road findings and try to apply them rigidly, to the point that the results will be disastrous in states where the problems are different. There is today for example, many a state highway specification which explicitly prescribes expansion and contraction joint spacings for concrete pavement, within a fraction of an inch, apparently without regard to local climate, aggregates and other variables.

The fact is that across the nation, highway engineers are working with literally thousands of combinations of traffic, climatic and material characteristics. A determination of the adjustment or correction factors, in terms of design load repetitions is, indeed, a problem of fundamental importance, as is being borne out by Hveem of California and others.

Test roads or no test roads, our anonymous research engineer friend is not the first highway engineer of our acquaintance to feel that far more can be done right at home in evaluating problems, based on data already available. Not enough states are periodically surveying the results of each season's construction. Not enough are making adequate studies of the performance of their roads and applying common-sense methods for improving on the economy and durability of their current construction.

Particularly, much can be gained by correlating "here at home" road behavior with the steadily rising weight and volume of traffic, since a study of the "yield point" or point-of-failure is basic to the study of any engineering structure, including a highway roadbed.

Contracting street maintenance

In this issue is a story of how the City of Portsmouth, Virginia, saves money by contracting for its street maintenance work. It might pay many towns and small cities to take a close look at their *true* maintenance costs. Cost accounting systems can be deluding. Many communities kid themselves into thinking they can perform maintenance work for less than a contractor. The basic justification for this reasoning is that the contractor adds a profit, whereas the city does not. Little thought is given to other factors which enter into all costs. The unit cost of a square yard of paving involves not only materials, payroll, and fuel, but costs which are seldom considered.

Some of the more common factors usually omitted are: equipment depreciation; public property and liability insurance, fire insurance, or where no insurance is carried by a city, the potential lawsuit as a result of accidents; non-productive time due to inclement weather, delays in material delivery, equipment out of service for repairs; payments for annual and sick leave as well as holidays; city's contribution to social security and possibly a supplemental retirement plan; and, workmen's compensation either through insurance or self-insurance.

When these costs are added to those usually considered, some city official may be in for a rude awakening.

Many of the country's larger cities contract for all or a portion of their street maintenance work. In some cases this is done for political expediancy, but in other cases it is for purely economical reasons.

• The biggest single highway contract awarded on the Indiana Toll Road to date is not for earth moving, nor for paving, but of all things, for the construction of 10 service areas, including restaurants and filling stations. Road building certainly takes in a lot of different things these days, what with nearly $12 million going for this one phase of a single turnpike project.

IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS

New Proving Ground for Ford

S. J. Groves & Sons, Inc., awarded rush job involving 3½ million cubic yards of grading and various types began in mid-summer.

A CONTRACT to build the roadways at Ford Motor Company's Michigan Proving Ground near Detroit has been awarded to S. J. Groves & Sons, Inc., of Minneapolis, and the earthmoving work is now in progress. The roads include a high-speed test track, a straightaway, two blacktopped durability roads, a gravel durability loop, and five test hill strips.

The high-speed track is a five-mile oval with a 2,500-ft. radius. It is a five-lane road, 60 ft. wide and super-elevated for a neutral speed of 140 mph. Banking of the curves is quite sharp, with the outer edge of the pavement rising as much as 11½ ft. above the inner edge. A total of 189,569 sq. yd. of reinforced concrete pavement 9-in. thick will be required for the high-speed track.

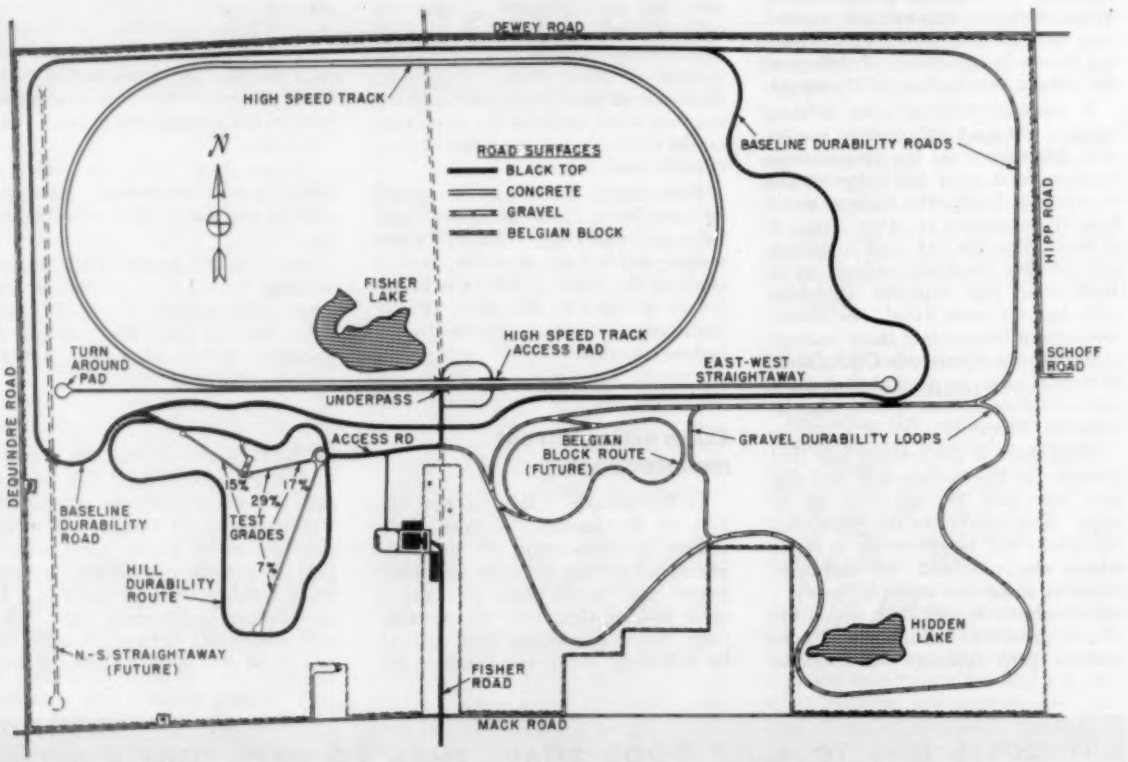
The straightaway will be 2½ miles long, with turnaround pads 200 ft. in diameter at each end. It will be paved with 58,098 sq. yd. of 9-in. reinforced concrete.

The black-topped roads will include a 7.2-mile basic durability loop and a 2.3-mile hill durability loop. The former will require about 11,000 tons of bituminous concrete, 34,000 tons of bituminous aggregate binder and 54,000 gal. of bituminous prime coat. Specifications of the latter road call for approximately 4,000 tons of bituminous concrete, 11,000 tons of aggregate binder and 10,000 gal. of prime coat. A third durability loop, 8.05 miles long, will be paved with gravel.

Estimates of the amounts of earth to be removed during roadways construction are 2,600,000 cu. yd. for the combined high-speed track and straightaway, 280,000 cu. yd. for the five test grades, 236,000 cu. yd. for the gravel durability loop, 182,000 cu. yd. for the basic durability loop and 123,000 cu. yd. for the hill durability loop — nearly 3,500,000 cu. yd. in all.

The asphaltic paving projects and the earthmoving operations for all of the roads will be finished late this fall. Completion of the concrete roadways is scheduled for September, 1956.

● A decision in Massachusetts recently favored the Laborers Union over the Plasterers and Cement Finishers Union, in a controversy as to who has jurisdiction over asphalt sidewalk placement and finishing. The National Joint Board for Settlement of Jurisdictional Disputes, in Washington, rendered the decision, involving a job in Boston.



● Ford Motor Company's new proving ground pavement system now under construction.

Roads and Streets in the News

Nation's Press Voiced its Feelings on Highway Bill

Dirty Work on the roads

(From an editorial in Life, August 13, 1955)

The authors of our Constitution (and Philadelphia was hot that summer, too) gave Congress the power "to establish postroads." But the 84th, before adjourning last week, proved incapable of exercising that power. Its failure to pass a new highway bill was as scandalous a show of political incompetence as our democracy has seen in years.

As every licensed driver knows (about 75 million of us) the need for new highways is desperate. More than half our primary road system was built for the cars and speeds of 20 and 30 years ago. As a recent LIFE article pointed out (May 30), obsolete highways add an unnecessary one or two cents to the cost of every single car-mile in extra gas, oil, tire wear and lost time. The President last week called new highways "absolutely vital to our future," and he is right.

. . . So now our new highway system will have to wait until next session before it even gets started. So many more lives unnecessarily lost, so many more man-hours wasted in traffic jams, so many more nervous breakdowns. What is worse, there seems to be a chance that when Congress meets again, it may repeat the whole stupid fiasco. To prevent that, every car owner could do himself a service by letting his congressman know how he feels about our highways — preferably right after that Sunday evening drive home from the lake.

Highways will be built

(Editorial, Milwaukee Journal, August 4, 1955)

Defeat in Congress of a vastly expanded federal highway aid program comes as a disappointment to Wisconsin highway officials. . . . But failure of Washington to act isn't going to stop our state highway department from going ahead with detailed plans for the heavy traffic arteries.

The expectation is that next year Congress will reach agreement on broader aids and Wisconsin will be able to take immediate advantage of them. But whether the aids prove to be generous or limited, the highways will eventually have to be rebuilt.

. . . Now in the planning stage, is replacement of U. S. 41 from Milwaukee south and of U. S. 12 from Eau Claire to Hudson. How soon these costly superroads can be built — with broad rights of way, grade separations and intricate traffic interchanges — will depend on how soon money is available from federal or other sources.

In the meantime, it is sound foresight to have the time consuming planning and designing out of the way.

Red light on roads

(Editorial, New York Herald Tribune, July 29, 1955)

The Democratic party climbed to marvelously high moral ground to wage its battle against President Eisenhower's highway program. Its members were a little unaccustomed to the altitude. All through the legislative session, however, they managed to make noises indicating that its provisions for extra-budgetary financing were deceptive and conveying the impression that — perish the thought — a spendthirft had found his way into the White House.

It would be funny if we didn't need the roads so badly.

President Eisenhower's program recognized that highway construction had never recovered ground lost during the war and that this fact, combined with annual gains in the number of vehicles registered, was bringing us face to face with a real emergency. Automobiles are basic to the American economy, and if roads are not provided for them to operate on every one is going to suffer.

The President's plan was for a massive effort to catch up, financed in part by the issuance of $21 billion in bonds that would not be part of the national debt, and that would be paid off by the revenues from certain taxes.

Although the Democrats opposed it on the aforesaid moral grounds, one suspects that the proposal's really fatal flaw was that it was too good, that the opposition couldn't bear to help the President solve the problem so cleanly and get the credit for it.

At any rate, their counter-proposal was for vastly more of the same old federal aid, accompanied by increased taxes on fuels, tires and heavy vehicles. The only trouble was that their own numbers didn't have what it took to stand up against the vocal opponents of the new levies and the whole business collapsed — and much to the leader's surprise — on the floor of the House.

All of which leaves the country stalled in the traffic, with plenty of time to mull over how to vote next time.

ACI meeting at Atlanta

The American Concrete Institute's Southeast Regional Meeting will be held Oct. 31-Nov. 1, 1955, at the Atlanta Biltmore Hotel, Atlanta, Ga.

The tentative program includes the following subjects: construction of Dauphin Island Bridge and Lake Pontchartrain Bridge, thin-shell precast concrete, silicone water repellents for masonry, lightweight-aggregate concrete, concrete masonry wall construction, cracking of masonry walls, concrete stress distribution in flexure, diagonal tension, and concrete shear strength.

Co-chairmen for the event are William H. Armstrong, structural engineer, Atlanta, and William R. Ireland, president, Atlanta Aggregate Co., Inc., Atlanta.

• "Today in our judgment there are greater opportunities for civil engineers in construction than at any time in the history of our country." — Dwight W. Winkelman, president of D.W. Winkleman Company, Syracuse, N.Y., in a paper presented before the American Society of Engineering Education.

Two Pavement Types for Kansas Turnpike

CONCRETE has been chosen as the pavement type for the 55-mile Kansas Turnpike section between Topeka and Kansas City. And asphaltic concrete will carry the motorists for the remaining 180 miles from Topeka to the Oklahoma border. The project is currently in the grading state, and pavement contracts were due to be awarded soon.

This compromise decision on paving was announced by the Kansas Turnpike Authority, following an investigation of pavement design and economics for the project. Frank Gilmore, former district engineer of the Asphalt Institute at Kansas City, Mo., and Professor Charles H. Scholer of Kansas State College, were employed to advise the turnpike officials and consultants on the question.

It is explained that the choice for the respective sections was an economic one in each instance, taking into account the availability of materials and character of soils along the route.

The portland cement concrete pavement design calls for a 4-in. stone subbase laid across the entire grade, 1-in. sand leveling, and 10-in. reinforced concrete pavement 24 ft. wide, with 10-ft. outer and 4-ft. inner shoulders surface treated. Recent bids on this design indicated about $190,000 to $205,000 per mile according to Joseph Sorkin of the general consultants, Howard, Needles, Tammen & Bergendoff.

The bituminous design includes a 10-in. subbase over full grade width, 8-in. crushed stone base, 2½-in. asphalt concrete binder course, and 1½-in. asphalt surface course. This design was bid at prices ranging from $180,000 to $195,000.

Prices in both instances included shoulders. The prices of the two types as indicated by these figures are not directly comparable, Mr. Sorkin noted, because of variations in locale and attendant differences in costs of aggregates, base materials and other factors.

Meetings Ahead

ASSOCIATED GENERAL CONTRACTORS OF AMERICA — Board Meeting, Minneapolis, Minnesota; September 26-29.

AMERICAN PUBLIC WORKS ASSOCIATION — Annual meeting and equipment exposition, Hotel Schroeder, Milwaukee; Oct. 2-5.

14TH ANNUAL CONFERENCE ON ROADSIDE DEVELOPMENT — Ohio State University and Ohio Department of Highways, Departments of State Building, 65 South Front Street, Columbus, Ohio; October 4-7.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS — Annual meeting, Peabody Hotel, Memphis, Tenn.; October 14-15.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS — Annual convention, Charleston, West Virginia; October 17-19.

NATIONAL SAFETY COUNCIL — Annual Safety Congress and Exposition, Conrad Hilton Hotel, Chicago, Illinois; October 17-21.

AMERICAN CONCRETE INSTITUTE — Southeast regional meeting, Atlanta Biltmore Hotel, Atlanta, Ga.; Oct. 31-Nov. 1.

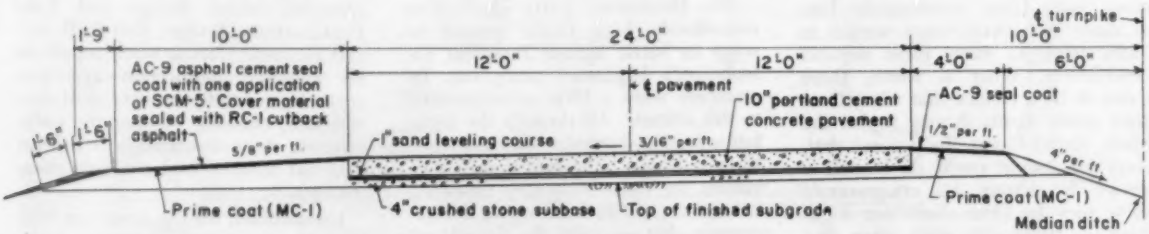
UNIVERSITY OF MINNESOTA — Second Annual Bituminous Conference, Minneapolis; November 2.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS — 41st Annual Convention, Jung Hotel, New Orleans, La.; December 4-9.

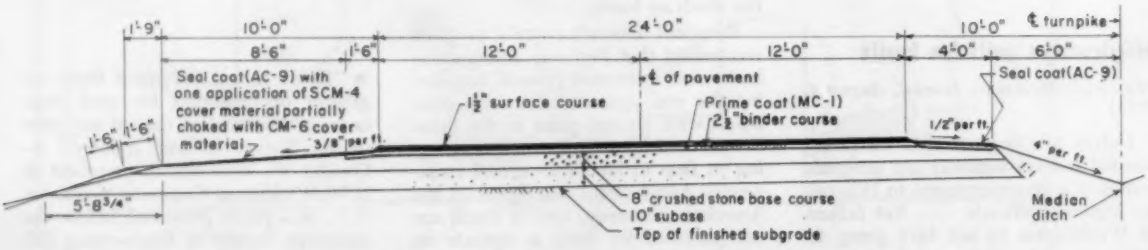
AMERICAN ROAD BUILDERS ASSOCIATION —54th annual convention and Highway Materials and Supplies exhibit, Municipal Auditorium, Miami Beach; January 11-14, 1956.

HIGHWAY RESEARCH BOARD — 35th Annual meeting, Washington, D. C.; January 16-20, 1956.

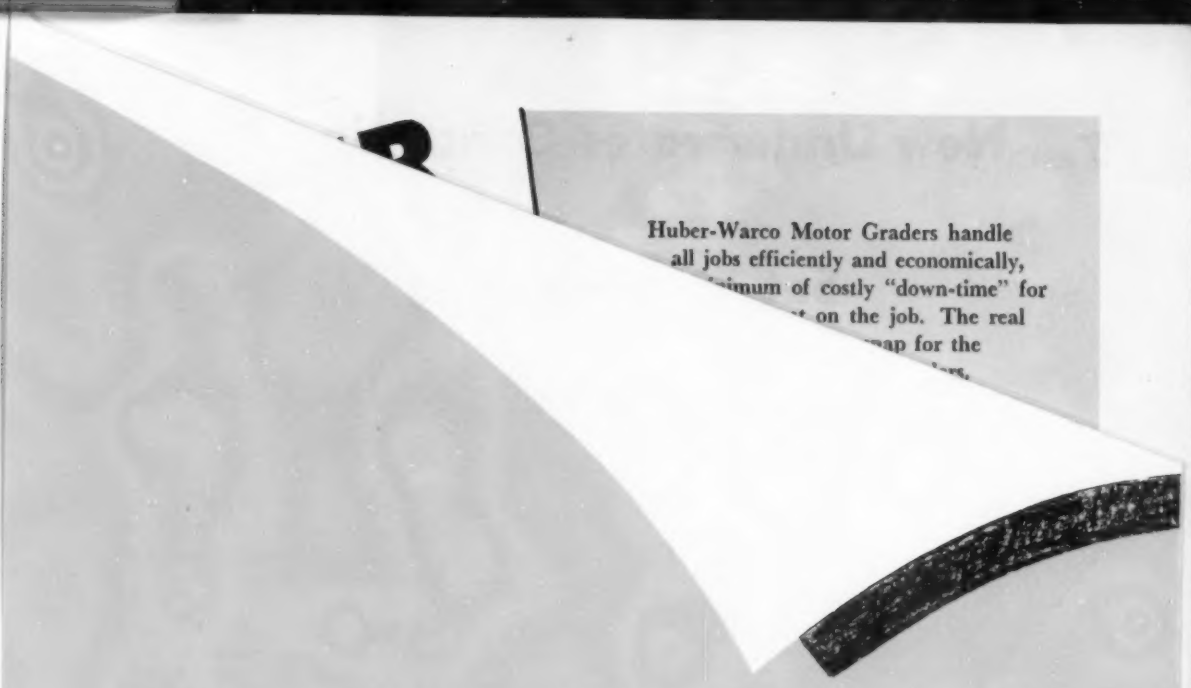
ASSOCIATED GENERAL CONTRACTORS OF AMERICA — Annual Convention, Waldorf-Astoria Hotel, New York, N. Y.; February 13-16, 1956.



● Portland cement concrete pavement cross-section adopted for the Kansas Turnpike, to be used east of Topeka.



● Asphaltic concrete and flexible base design for the Kansas Turnpike's mileage west of Topeka.



CATERPILLAR ANNOUNCES

2 NEW

TRAXCAVATORS

CATERPILLAR LEADERSHIP
IN ACTION

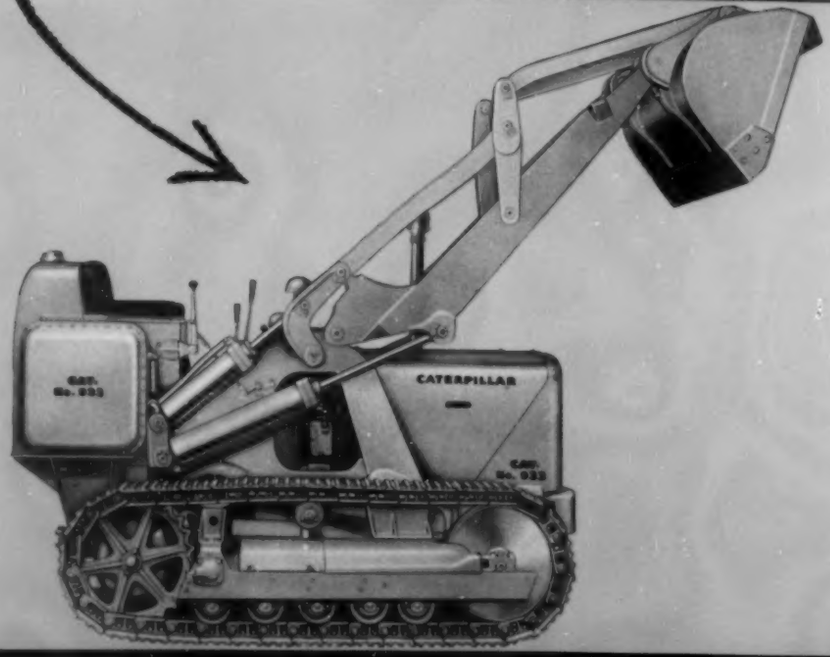
Two Pavement T

CONCRETE has be
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NEW
No. 955
1½-yd. capacity



Balanced units for bigger profits!



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No.
1-yd. c



...rco Motor Graders handle
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...ostly "down-time" for
...job. The real

"Big production" features of the new CAT No. 955 and No. 933 Traxcavators

40-DEGREE BUCKET TIP-BACK AT GROUND LEVEL. Tip-back action at low bucket height results in maximum possible loads every pass in any material—bigger production per day!

NEW OIL-TYPE CLUTCH. Stands up under continuous repeated use. Cuts maintenance costs and time two ways. (1) Clutch adjustment, while easy, is seldom required. (2) Plate replacement is often unnecessary even at engine overhaul.

Also helps step up production by providing easier shifting for operator!

MODERN HYDRAULIC SYSTEM. Hydraulically balanced vane-type pump insures delivery of full volume and pressure of oil for thousands of hours. Control valves located in tank receive maximum protection against damage and dirt. Closed hydraulic system—no vents or breathers—prevents entrance of dirt. Full-flow hydraulic system filter protects moving parts against abrasive particles in fluid. Filter handily located for easy replacement of element!

PLENTY OF POWER. Power is ample to "bury" the bucket and provide fast lifting action and positive dumping under all load conditions.

"DESIGNED-IN" COMFORT. Operator sits high, with excellent visibility of all bucket positions. All controls easy and convenient to operate—bucket control a one-hand operation! Pilot-house visibility —leisure-chair comfort.

PERFECT BALANCE. Weight distribution, engine horsepower and bucket capacity are balanced so that the full length of the track stays on the ground with a heaped load in the bucket.

NEW 3-GROUSER TRACK SHOES. Tested and proved on tough jobs, they deliver better traction—longer life!

OPTIONAL STARTING. Your choice of 6-volt electric starting for starting engine or 24-volt direct electric starting—from the seat, either way.

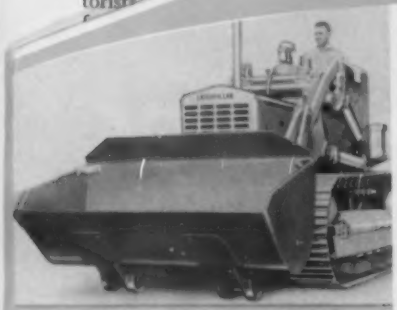
VERSATILE ATTACHMENTS. Your job range is increased by a variety of buckets and other useful attachments.

...BARCO

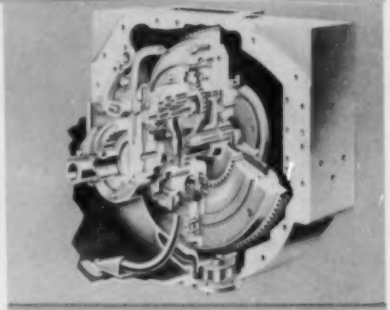
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Two Pavement Types for Ka

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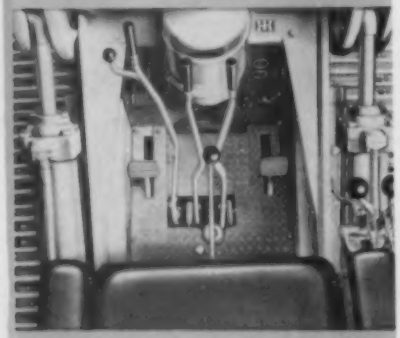
40-DEGREE BUCKET TIP-BACK AT GROUND LEVEL assures large loads every pass!



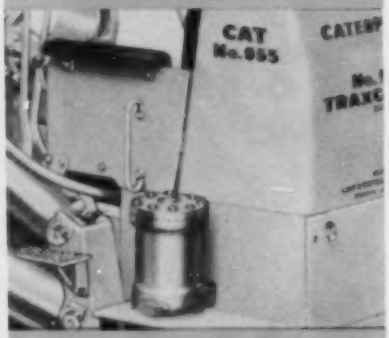
NEW OIL-TYPE CLUTCH sets new records for long life and minimum maintenance!



HIGH REACH with box-section lift arms for rugged service. Cross brace prevents twisting!



CONVENIENTLY LOCATED LIFT AND DUMP LEVERS provide one-hand operation!



HYDRAULIC FILTER IN HANDY LOCATION affords easy replacement of the element!

BRIEF SPECIFICATIONS

	No. 955	No. 933
Flywheel HP at sea level	70	50
Bucket capacity, cu. yd.	1½	1
Bucket tip-back at ground level, degrees	40	40
Bucket tip-back at max. lift, degrees	47½	48
Dumping height (center of hinge pin to ground)	128"	118½"
Weight (approx.) lb.	21,480	15,500

—AND MANY OTHER FEATURES!

Balanced for more work at less cost...

The new Caterpillar No. 955 and No. 933 Traxcavators

Designed from the ground up as excavating and loading machines, the new CAT* No. 955 and No. 933 Traxcavators are balanced *units*. Built and backed from tracks to buckets by *one* manufacturer, they also give you advantage of *one* service source—your nearby Caterpillar Dealer. With practical, advance-design features, they're engineered to *outproduce* ordinary tractor-shovels of equivalent size. You'll find these versatile units the handiest tools in your equipment line-up. Get the money-making picture from your Caterpillar Dealer—ask for a demonstration!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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NEW BIG-PRODUCTION TRAXCAVATORS

MAIL TODAY!
CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

I'd like more information on the new No. 933 and No. 955 Traxcavators.

Name_____

Company_____

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POWER PACKED BY HUBER-WARCO for TOUGH JOBS

Huber-Warco Motor Graders handle all jobs efficiently and economically, with a minimum of costly "down-time" for blade adjustment on the job. The real tough jobs are a snap for the Huber-Warco Motor Graders.

Huber-Warco 4D Series Motor Graders range from 75 to 123 Horsepower. The 5D-190, with torque converter and power-shift transmission, develops 195 H.P.



CHECK THESE HUBER-WARCO FEATURES

- Completely cab-controlled blade movement, 90° either side—no manual adjustments.
- Mechanical steering with hydraulic booster.
- High front and rear axle clearance.
- Retractable scarifier permits 360° blade rotation for back-up pass.
- Easy to reach controls.
- Wheels and tires are completely interchangeable.

For Complete Details — See Your Huber-Warco Distributor

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MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

. . . for more details circle 217, page 14

New Underwater Concreting Records

Set at Mackinac Bridge

Mortar intrusion technique employed in placing over 22,000 cu. yd. of pier concrete in 5-day period.

CONSTRUCTION work on the substructure for the Mackinac Bridge project was recently highlighted by the establishment of new world's records for underwater concrete placement. In setting these marks, the contractors surpassed previous records which they themselves had set late in 1954. During one 24-hour period in May, 6,250 cu. yd. of concrete was placed, while production for a 5-day run was 22,378 cu. yd.

All concrete for the foundation piers of the Mackinac Bridge is being placed by the Prepakt method by the substructure contractor, Merritt-Chapman & Scott Corporation. The Prepakt Concrete Co. is assisting M-C & S in the placement of some 450,000 cu. yd. of Prepakt concrete in the 34 piers, some extending to over 200 ft. below the water surface.

The new records are all-time highs for underwater concrete placed from a floating plant (or plants) by any method at any time, and are shown on the attached table.

Speedy placement of Prepakt concrete is possible because all aggregate stone, over 60% of the total concrete volume, is preplaced in cofferdams and forms without mixing and is not subject to the speed limitations of concrete mixers. The mixing plant handles less than 40% of the total volume, the Intrusion mortar, which is used to consolidate the stone into Prepakt concrete. As this Intrusion mortar is pumped into the aggregate, it displaces the water without dilution and completely fills all voids.

At Mackinac, stone is deposited directly into cofferdams from 10,000 to 15,000 ton self-unloading boats at rates from 2,000 to 2,500 tons per hour. On larger piers, simultaneous aggregate placement and consolation is being carried out. This was the technique used to establish the new underwater concrete placement figures.

All batching, mixing and pumping of Intrusion mortar for the Mackinac project are done from a fully integrated floating plant, the "Algonquin." Since no aggregate is processed by this plant, it is smaller, less costly and easier to maneuver than a conventional floating concrete plant.

Great flexibility of operation has been achieved by use of mortar-intruded concrete at Mackinac where the worst construction weather in years has been encountered. Flexible material transfer and pumping lines permit uninterrupted work during rough weather. Should extremely stormy seas require it, consolidation of preplaced aggregate can be halted and restarted on short notice at little added expense and with no sacrifice in the quality of the concrete.

Use of the Prepakt method of concrete placement has eliminated the continuous weeks-long pours (or costly interruptions) that would be neces-

● Simultaneous placement of coarse aggregate (by conveyor) and pumping of intrusion mortar on one of the main suspension tower piers at Mackinac.

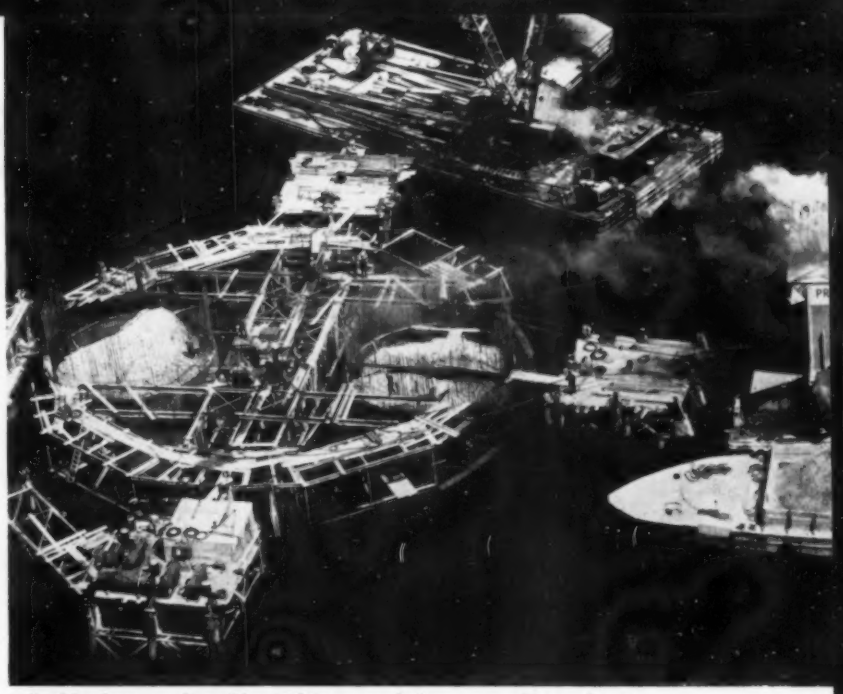


sary for the main piers with conventional tremied concrete. It has also resulted in greater economy and speed, as evidenced by the new placement records.

Intrusion mortar is composed of cement, Alfesil (a specially selected pozzolan), sand, water and Intrusion Aid. The last is a patented admixture that makes the unique Prepakt technique possible. It provides fluidity at low water-cementing materials ratios, suspends solids particles in fluid mortar, delays early stiffening and compensates for setting and settling shrinkage. Intrusion Aid also gives the mortar the ability to displace water completely, making underwater Prepakt concrete indistinguishable from that made in the dry.

The Mackinac Bridge, on schedule for a projected completion date late in 1957, will be the world's longest suspension bridge from anchorage to anchorage. It will connect the two peninsulas of Michigan across the Straits of Mackinac.

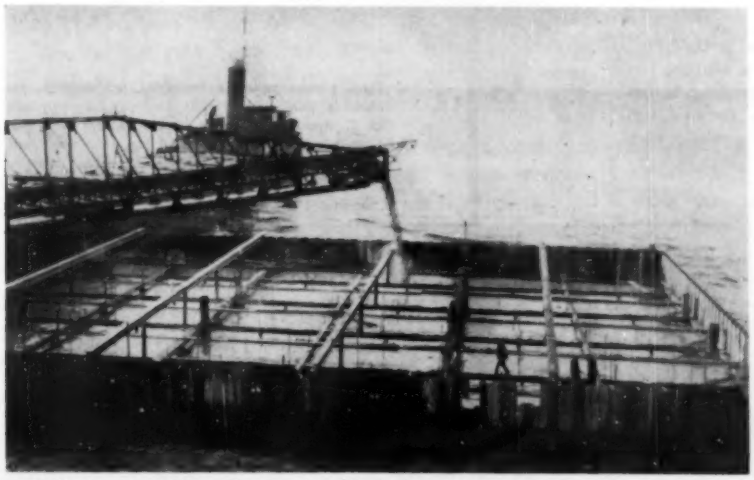
Dr. D. B. Steinman of New York City is the designing engineer. Grover C. Denny is the project manager for Merritt-Chapman & Scott Corporation, the substructure contractor; and J. W. Kinney is D. B. Steinman's project representative. Mered McKinzie is project superintendent and R. E. Davis, Jr., project engineer for The Prepakt Concrete Co., subcontractor to M-C & S. C. E. Haltenhoff is project engineer for M-C & S.



● In this photo, work on Pier 19 has emerged above water. The underwater section of the pier rests directly on bedrock over 200 ft. below the surface. Aggregate has been placed for the twin shafts which will support one of the two main suspension towers. Preparations are now being made for consolidation of the aggregate with Intrusion mortar.

Statistics on Subaqueous Concrete Job

	Old Record (Oct. 1954)	New Record (May 1955)
Maximum 24-hour production	5,040 cu. yds.	6,250 cu. yds.
Maximum 7-day production	24,217 cu. yds.	33,068 cu. yds.
Average daily production during record week	3,460 cu. yds.	4,724 cu. yds.
Maximum 5-day production	20,559 cu. yds.	24,181 cu. yds.
Average daily production during 5-day period	4,110 cu. yds.	4,836 cu.yds.
Maximum production — 30 working days	————	103,107 cu. yds.



● Cofferdam for cable anchorage pier. Crushed-stone aggregate being placed by a boom from a large self-unloading boat. Intrusion pipes have been set in place in preparation for pumping of mortar.

Alternate-side parking expanded in New York

The alternate-side parking program begun in New York City in recent months has been expanded with the addition of a 344 square block area in the Bronx. This area which will include 151 miles of curb space, was announced in detail to the public to help secure their cooperation.

The purpose is to facilitate street cleaning. Under the new regulations, parking will be prohibited from 8 A.M. to 11 A.M. on the North and West side of the streets, on Mondays, Wednesdays and Fridays; on the South and East curbs, on Tuesdays, Thursdays and Saturdays in specified areas. Then, a similar arrangement in another area takes in the hours from 11 A. M. to 2 P. M.

The City Department of Traffic is also relocating 91 bus stops from the near side of the intersection to the far side in connection with these changes, as part of an established policy.

TWIN-POWER "EUCS" ON

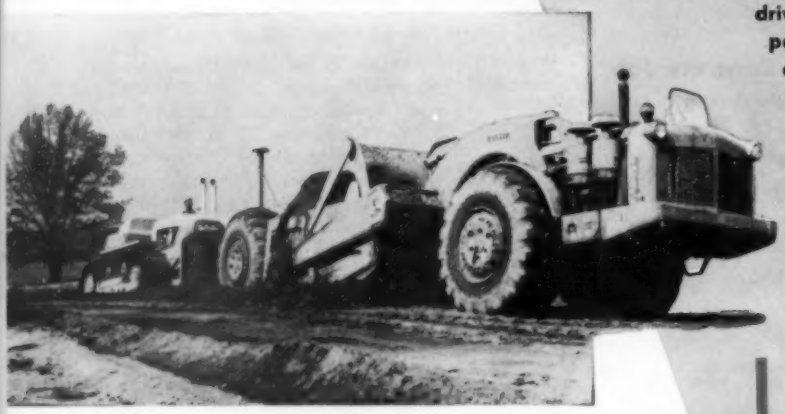


Power to move the earth! A Euclid TS-18 Scraper with two engines and total of 494 h.p. is push loaded by a TC-12 "Euc" tractor powered by two 194 h.p. engines—a total of 882 h.p. at work. Because of the difficult sandy conditions, Western's scrapers are equipped with extra power for the tractor drive axle—300 h.p. rather than 194 h.p.

Euclid Twin-Power Provides Unequalled

WORKABILITY

Twin-Power—the use of two engines driving separate axles—was pioneered in the earth moving field by Euclid nearly 10 years ago. It provides larger capacity with power equal to or greater than single engine equipment . . . uses power and drive components that have proved their performance in other equipment on hundreds of jobs. Torque converters and semi-automatic transmissions assure easy operation and a smooth flow of power to meet all job conditions.

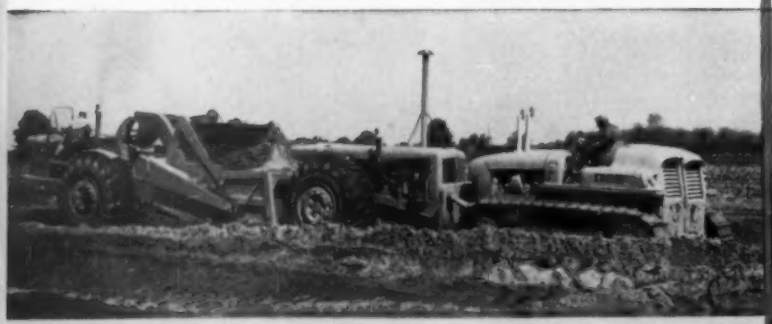


This TS-18 is one of Euclid's newest scraper models. It has a struck capacity of 18 cu. yds. . . . standard power is two 194 h.p. diesels with Torqmatic Drives. Western Contracting is using 10 of these "Euc" scrapers on the Indiana Turnpike.

*

See Euclids complete line at General Motors POWERAMA - The World's Fair of Power - Soldier Field Chicago, Illinois, August 31 through September 25.

There's twin power in these 50-ton Rear-Dumps too! Six of these big units, first used by Western on Ft. Randall Dam, are working under an 8 yd. dragline. With a total of 600 h.p. this "Euc" has plenty of power and traction to move capacity loads through loose sand and tough hauls.

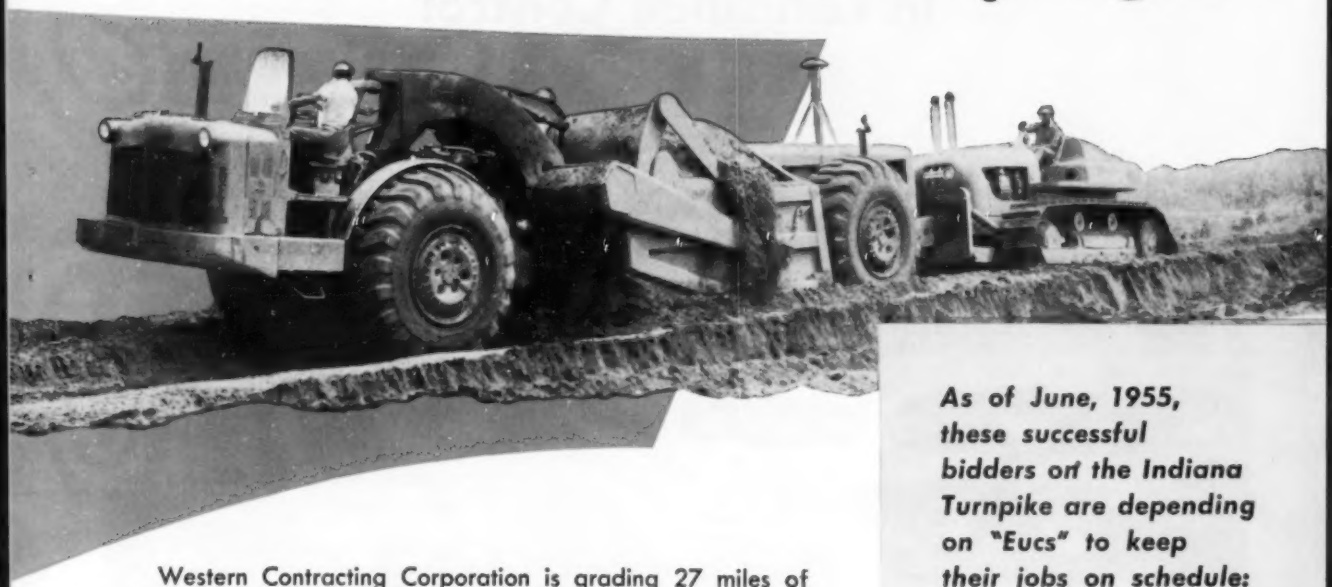


"Performance far above expectations" is the way personnel on Western's job describe the overhung engine Twin-Power Scraper push loaded by the new Euclid Twin Crawler.



WESTERN CONTRACTING'S

7 million yard Indiana Turnpike job!



Western Contracting Corporation is grading 27 miles of the new Indiana Turnpike east of Elkhart. About 7 million yards must be moved by November, 1956—work is currently on a two 10-hour shift basis six days a week. It's a big job—one that demands dependable equipment that can move big loads fast . . . the kind of job where Euclid Twin-Power performance really pays off.

On one section of their contract Western is using five TS-18 Euclid overhung Twin-Power Scrapers and 2 "Euc" TC-12 Twin Crawler tractors. Working in sand, the "Euc Twins" pick up loads of 15 bank yards or more and make round trips of a mile every 5 minutes, each averaging 180 bank yards production per hour. They travel at speeds up to 30 m.p.h. with full payloads and make the return trip over good haul roads with a top speed of 35 m.p.h.

Five other Euclid Twin-Power Scrapers and two additional TC-12 tractors are making the dirt fly on another section of Western's contract. On still another part of the job six 50-ton "Eucs" are hauling from an 8 yd. dragline. These Rear-Dumps, veterans of Ft. Randall Dam, are powered by two diesels having a total of 600 h.p. For complete information on the complete line of Euclid earth moving equipment or models suited for your jobs, call your Euclid dealer soon.

As of June, 1955, these successful bidders on the Indiana Turnpike are depending on "Eucs" to keep their jobs on schedule:

Arcole-Midwest Corp.
Chapin & Chapin
A. L. Dougherty
Peter Kiewit & Sons' Co.
D. R. Smalley & Sons
Suber & Co. and Ballenger Paving Co.
Union Building & Construction Corp.
Western Contracting Corp.
Winston Bros.

● ● ●

Again "Eucs" outnumber all competitive rubber-tired equipment combined on a big turnpike project!

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

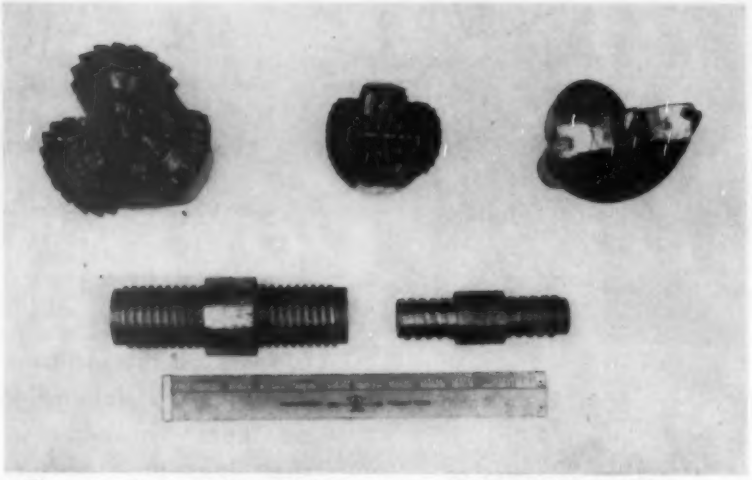
FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

GM GENERAL MOTORS

HORIZONTAL DRILLING

New California Approach In Landslide Control



● Figure 1 — Upper 4-1/2-in. rock bit, 3-1/8-in. rock bit, and 4-in. fish-tail bit with tungsten carbide inserts. Lower N-rod coupling and A-rod coupling.

Low cost is a feature of the methods here described, which are applicable in formations permitting use of standard drilling equipment.

By A. W. ROOT

Supervising Materials and Research Engineer, California Division of Highways, Sacramento

THE avoidance, prevention and control of landslides constitute an important phase of highway design, construction and maintenance in California. There are numerous types of landslide, which have been variously classified according to kind of material, type of movement, causes and a great many other factors.

Probably the most prevalent type of landslide, and the one which is most troublesome to highway engineers in California, is the "slump" type. In this type of landslide the movement occurs along internal slip surfaces, and characteristically the surface cracks are concentric, and concave toward the direction of movement; the top surfaces of the moving blocks or units are often tilted backward toward the slope; the surface of rupture may approach an arc of a circular curve, concave upward, but the shape of the curve is greatly affected by any discontinuities in the material. Most roadway slipouts are slump-type landslides.

The factors or conditions conducive to land movement are numerous, and it is seldom that one "cause" can be assigned to a landslide. Nevertheless, it is generally agreed that ground water is a major contributing factor in the vast majority of slump-type landslides in California. Ground water may act in several ways to induce land movement: the activating forces are increased by hydrostatic pressure or by seepage forces; in the presence of ground water, resisting forces are reduced by pore pressure or by lower shear strengths of the soil.

Interception and removal of subsurface water is often an effective method of preventing or controlling landslides, especially the "slump" type. One method of subdrainage used extensively in California consists of installation of horizontal drains, which are 2-inch perforated pipes placed in drill holes bored into a slope. The drains are usually 100 feet to 300 feet in length, and on gradients varying from 1 percent to 20 percent. Horizontal drains are frequently, but erroneously, described as "Hydrauger" drains. "Hydrauger" is the proprietary name of one type of drill used for installing horizontal drains.

One of the principal advantages of the horizontal drain method of controlling landslides is the relatively low cost compared to other methods of stabilization. The use of horizontal drains is restricted to soil formations which can be drilled economically with available drilling equipment. Constant efforts to improve methods and drilling equipment have made possible the economical installation of horizontal drains in all but the most difficult formations.

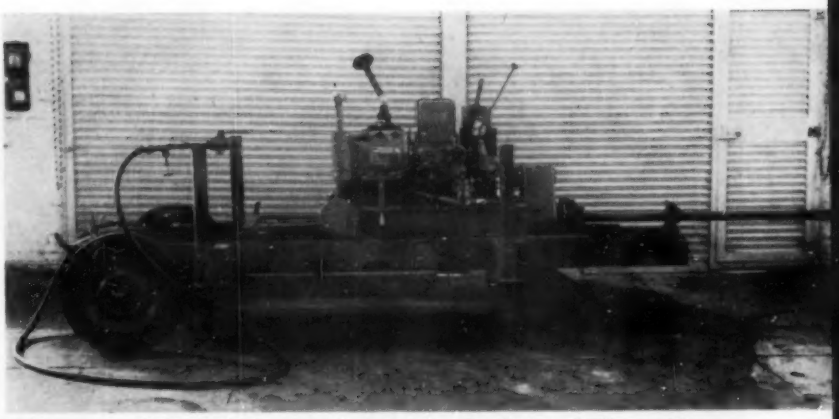
For several years all of our drilling was done with "Hydrauger" equipment and some of these units are still in use. Diamond* drill A-rods are used with these drills; all of our earlier drilling was done with fishtail or auger-type bits having tungsten

This article appeared in California Highways and Public Works, March-April, 1955.

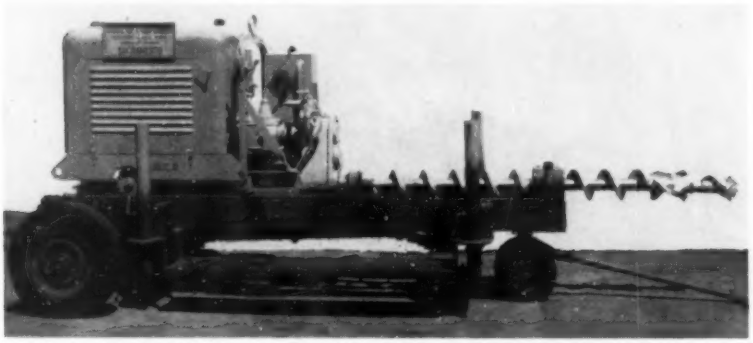
*This is a name designating standard core drill fittings, which may be used with any type of drill bit. Diamond-set bits, although used for coring solid rock or concrete, are not normally used for drilling horizontal drains.

carbide inserts. These bits were made up in our own shops. When small size oil-field type roller bits became available we experimented with them and found them greatly superior to the fish-tail and auger bits for drilling rocky formations. Accordingly, we adopted the roller-type bit for all drilling except in rock free earth. Figure 1 shows the rock bits and fish-tail type bit.

Adoption of the roller type bit enabled us to drill to greater depths and through more difficult rock formations which could not be penetrated with the fish-tail and auger bits previously used. But at the same time the more difficult drilling increased power requirements and caused greater stresses



● Figure 3 — California horizontal drill with drill rod and bit in drilling position.



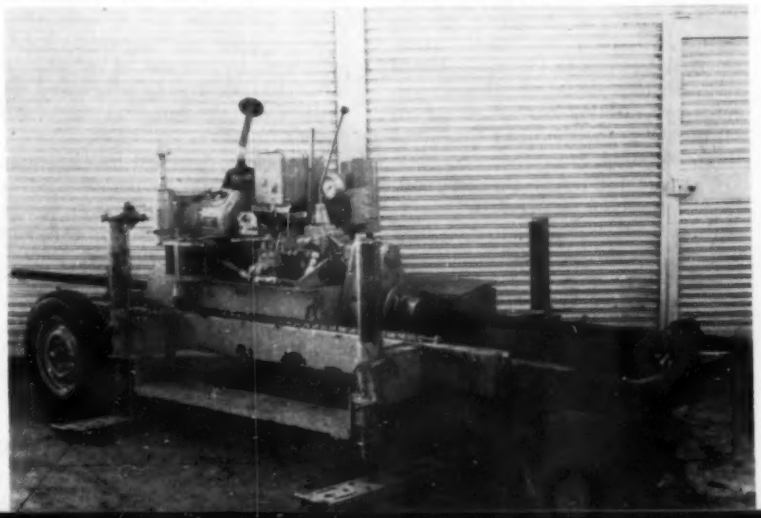
● Figure 2 — McCarthy rock-boring machine with helical auger and drill head.

on both the drill rods and the drill unit. As a result, breakage of the A-rods became excessive, and it was found that the Hydrauger air motors did not supply sufficient power. The type of drilling which we can do with the rock bits appeared to require a more rugged and more powerful drill unit than the Hydrauger which had been used exclusively in the past.

Our first attempt to use heavier drilling equipment was with the McCarthy Rock Boring Machine shown in Figure 2. This drill, which was designed for use with continuous helical augers, drills rapidly in earthy formations, but cannot drill to depths greater than about 150 feet, nor will it penetrate broken rock formations. By means of a water swivel fabricated in Headquarters Shop of the Equipment Department the McCarthy machine was converted to a rotary type drill, using diamond N-rods and a 4½-inch roller type rock bit. Figure 1 shows the relative sizes of the A-rod and N-rod. The converted machine operated very satisfactorily, and we found that the use of heavier drill rod, the hydraulic feed and superior power all were advantageous. This machine, however, had one serious drawback: when using the machine for forcing the casing into the drilled hole, the casing must be in front of the drill carriage, as the design of the machine prevents working through a chuck; this necessitates using lengths of casing which can be inserted between the carriage and outlet end of the drain at the ground surface. In restricted working areas it is necessary to use five-foot lengths of casing, with a correspondingly large number of field welds. Also the McCarthy machine is somewhat larger and more powerful than necessary for the rotary drilling work on our drain installations, which results in some sacrifice in mobility.

We could find no drill rig on the market designed specifically for drilling holes for horizontal drains, and none which satisfied our requirements. We desired a drill rig incorporating the following features: the drill unit should be complete with a gasoline engine of adequate power; a suitable transmission to permit control of speed of rotation over a wide range; a hydraulic feed with a minimum stroke of six feet, capable of exerting a 4,000-pound thrust; provision for slowly rotating the casing concurrently with the jacking operation when necessary; a chuck readily interchangeable for A-rod, N-rod or casing and so designed that long lengths of rod or casing can be operated through

● Figure 4 — California horizontal drill with casing in chuck.





● Hydrauger drill in operation.

the chuck; rugged but easily operated spuds for maintaining alignment and grade of the drill; rubber-tired wheels and three-point suspension to permit sharp turns; and, finally the over-all length not to exceed 12 feet and the weight of the complete drill to be not more than 3,000 pounds.

The Materials and Research Department had for several years realized the need for such an improved horizontal drill, and as no completely suitable machine could be purchased, it was decided to design and build a drill unit specifically for horizontal drilling. Accordingly, the Equipment Department was requested to design and build a machine meeting the specifications outlined above. As a result of this request Mr. Jim Keleher, equipment design engineer, was assigned by Equipment Engineer Earl E. Sorenson to do the job. Mr. Keleher, with the cooperation of the author and other personnel of both the Equipment and Materials and Research Departments, began designing the rig in January, 1954. By March, 1954, the final drawings had been completed for a machine having the desired features and meeting our specifications; on June 30th the shop had completed its construction.

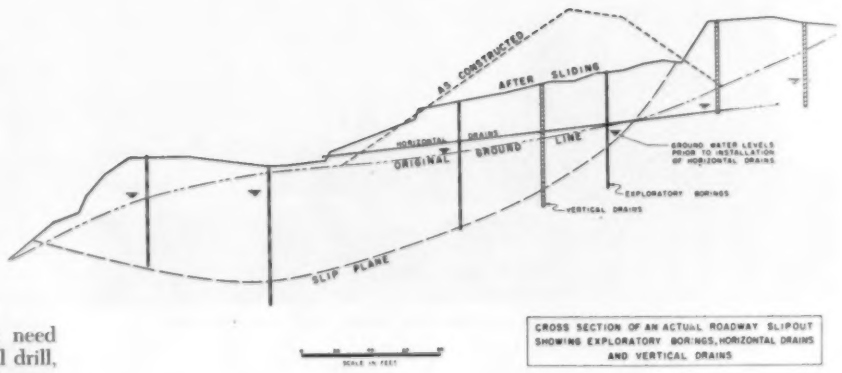
The new drill rig, for the most part, is comprised of standard or proven parts or subassemblies similar to those used in manufactured drills. The machine is unique because it incorporates the desirable features of various machines into a light-weight, compact drill rig especially suitable for the type of drilling required for installation of horizontal drains. The power unit is a 20-h.p. Wisconsin four-cylinder, air-cooled engine, connected through a fluid drive to a four-speed Ford transmission. Rotation of the chuck is accomplished by a gear train from the transmission enclosed in an oil-tight housing. The entire drive assembly is mounted on a hydraulically operated carriage with a travel of six-feet. A Vickers 10 - gallon - per - minute oil pump, driven by the Wisconsin engine, supplies oil to two hydraulic cylinders, by means of which the thrust can be controlled at any desired feed pressure up to 4,000 pounds.

A specially designed chuck assembly was required to permit the use of long lengths of drill rod or casing, and to provide for interchanging chucks for different size rods. Standard A-rod and N-rod chuck heads are used, with a shop-designed chuck holder which permits quick change of chuck heads. A special chuck for gripping the two-inch casing is used in the same chuck holder. The completed drill rig is shown in Figure 3 and Figure 4.

During the design of the machine many difficulties were encountered. Because these problems were solved on the drafting board rather than by cut and try methods, very few modifications were required after the machine was fabricated. The cost of constructing the drill did not exceed the preliminary estimate.

On completion of the drill rig it was taken to American Canyon on U. S. 40 in Solano County for its first operational test. During this test it performed satisfactorily, and has since been used on two other horizontal drain jobs. One of these installations was in District V on San Marcos Pass where the new California horizontal drill rig was used exclusively. Eighteen drains were installed at this location, five of which were 300 feet or more in depth and 7 others at least 250 feet deep. This drilling was done at a very reasonable unit price, comparatively speaking, and the drains were very successful in intercepting the subsurface water. The ease with which this work was accomplished by the new drill rig was a new experience and a great satisfaction to every one associated with it.

As was expected, operation of the new drill revealed some "bugs"; however, only a few minor changes were found necessary and these are currently being made. The satisfactory performance of this first drill unit and its freedom from defects attest to the soundness of design and the high quality of workmanship. All personnel who participated in the conception, design and construction of this new horizontal drill are to be commended for their ability and efforts.



CROSS SECTION OF AN ACTUAL ROADWAY SLIPOUT SHOWING EXPLORATORY BORINGS, HORIZONTAL DRAINS AND VERTICAL DRAINS



Cutting a mountain down to size!

Le Roi Tractair provides low-cost air to help dig 30'-deep cut in hard rock

On this job in Arizona, the mobility of Tractair really paid off. It allowed the contractor to make this 30-ft.-deep drainage cut at the same time he was working on the main part of his contract.

Because Tractair is self-propelled, with a low center of gravity, it travelled over this rocky terrain with ease. There was no tying up of trucks and men to move compressed air and tools to the spot. Tractair, with its 125 cfm capacity, took care of the whole operation. And the savings to the contractor were substantial.

The versatility of Tractair, since it is a combination 42-hp wheel tractor and 125-cfm compressor, can save you money, too. You can use it for drilling, tamping, driving form pins, breaking pavement, and a host of "odds and ends" jobs. Write for complete details.

T-34

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin



PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • AIR TOOLS • ENGINES

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. . . for more details circle 224, page 14

Cement Tanker Has Worm Spreader



● Special contractor-built cement spreader used in the construction of cement stabilized base, Bayshore Freeway south of San Francisco.



● Close-up of the pump and feed mechanism on back end of the truck.

OUT in California a familiar part of the procedure in constructing concrete pavement is the processing of soil-cement base between the forms.

In placing materials and processing them for cement-treated base on a section of the Bayshore Freeway, South of San Francisco in 1954, the contractor, Charles L. Harney, Inc., of San Francisco, used the special equipment pictured here. Usually four inches depth of granular materials previously struck off between the forms was first windrowed by a windrowing machine, then cement was placed on the windrow in metered amounts, followed by the application of moisture and mixing with a Madsen road pug.

The cement spreader, devised by the contractor's personnel, consists of a Mack truck (10-wheel) on which is mounted a cement transport tank. On the back end of the tank is mounted a gear-driven worm enclosed in a trough.

This trough hangs out over the windrow as pictured. From a hole in its end the cement is dropped at a positive rate, the discharge working off of the speed of the truck.

Following processing with the Madsen unit, the material was leveled with a Standard subgrader and Caterpillar 12 motor grader, struck off by a tractor-drawn screed, rolled with a 12-ton, 3-wheel Buffalo-Springfield roller, shaved to final precise grade with a Lewis subgrader, rolled with a rubber-tired self-propelled roller, and given an emulsion curing coat, preparatory to placing concrete pavement.

Equipment was lifted on and off of the forms at the frequent bridges encountered on this project by a Lima truck crane, as pictured.



● Madsen road pug is blending granular materials, cement and moisture.



● Tractor shovels "moved concrete," not earth, on this expressway project in New York City.

Tractor Shovels Used As Concrete Buggies

USING two tractor shovels as concrete buggies was the solution devised by Slattery Rock Corporation, Bronx, N. Y., for the tricky problem of pouring under a viaduct with underclearance too low to allow use of paving machines.

Slattery has a paving contract for a portion of New York City's six-lane Major Deegan Expressway, which will connect with the southern end of the New York State Thruway. Work progressed without interruption until paving crews reached a viaduct which stretched for 800 ft. over four of the six 12-feet-wide lanes. Clearance under the viaduct was 14 ft., too low to permit raising of the pavers' skips to feed batch into the mixing drum. But work had to continue without delay because of a rigid time schedule.

Four-wheel-drive Michigan tractor shovels were used here with success. The paving machines were moved to the fifth lane, not covered by the viaduct. Mixed concrete was discharged directly into the tractor-shovel buckets, filling them slightly less than the 1.6-yd. capacity to avoid spillage while traveling over rough ground.

Equipped with automatic shift and power steering, the tractor shovels scooted back and forth between the pavers and the four overhung lanes, maneuvering handily between supporting columns. They pushed directly up to footings before making a pour.

According to John Saunders, job superintendent, from 200 to 250 passes of the tractor shovels were made to pour each 800-ft. lane in four hours. Further along on the job the Michigans were used in spots where utilities and other obstructions hampered use of the paver.

AGC of Minnesota has scholarship plan

Five University of Minnesota civil engineering students will receive scholarship assistance in 1956 under the terms of the new Scholarship Fund sponsored by the Associated General Contractors of Minnesota, Inc. (AGC). In a joint announcement the University of Minnesota and AGC of Minnesota, Inc., said that this program is designed to help meet the increased demand for professionally trained civil engineers in connection with record construction volumes anticipated in the coming years in all fields of building, highway and heavy projects.

The scholarship grants of $300 per year each will be available to residents of Minnesota, who prior to entering the University have completed two or more years of engineering training on the college level or its equivalent, and who are pursuing or intend to pursue advanced training in department of engineering, Institute of Technology, University of Minnesota. The students must also indicate academic aptitude, vocational promise, character, leadership, and financial need.

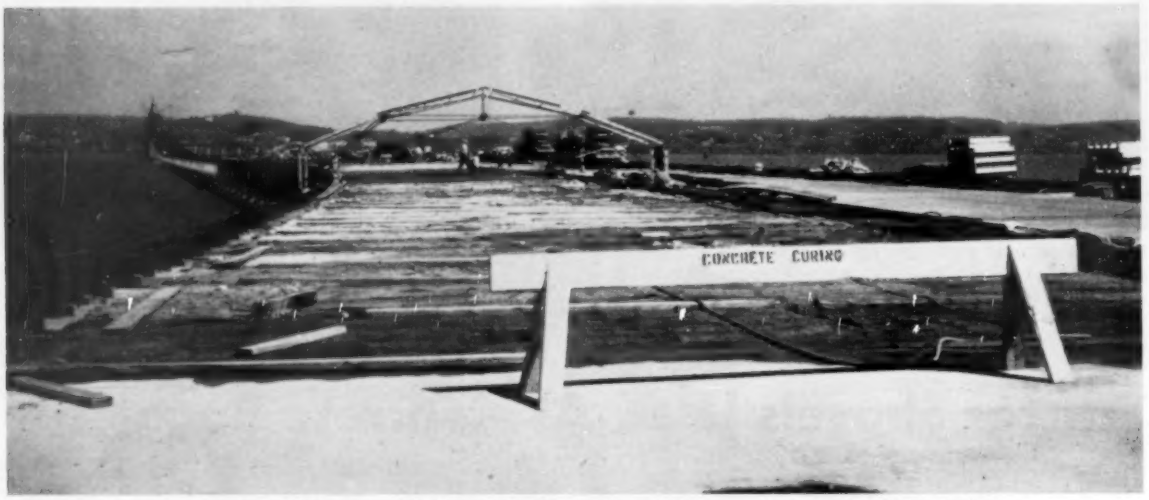
The selection committee includes Professor George J. Schroepfer, head of the department of civil engineering (chairman), George Risty, director of Bureau of Student Loans & Scholarships, University (permanent secretary), one member of the civil engineering teaching faculty, and three members, one from each occupational division of AGC.

The students selected will participate in various association functions throughout the school year, will be employed by contractors during the summer months if they desire, and will receive the association's publications. Additional activities are being planned under the direction of an association sub-committee of the Public Relations Committee, to be named the Engineering Education Sub-committee, in an effort to encourage young men to pursue the various opportunities available in the construction industry.

Hartford area has $35 million bridge plan

A plan for the City of Hartford, Connecticut, involving the construction of five new toll bridges simultaneously across the Connecticut River in the area, is under active consideration. The job would cost $35 million, to be financed by revenue bonds issued by a new state authority, it is proposed, with construction and maintenance by the state highway department. This proposal is a counter one to a $90 million East-West Thruway recently advocated for Hartford.

Job and Equipment Ideas



● Workers have no excuse for making dog tracks through fresh concrete with this conspicuously marked barricade.

Barricade marked for concrete curing

Workers as well as visitors sometimes step into fresh concrete when they don't think twice. To insure that this would not happen on the New York Thruway Bridge project recently under construction over the Hudson River, the contractors, Garafano-West Shore-Euclid, used clearly marked saw horses, such as the one pictured.

The letters "Concrete Curing" stare the onlooker in the face as he comes toward the area thus barricaded. This lettering tells workers that the concrete is still not ready to step on.

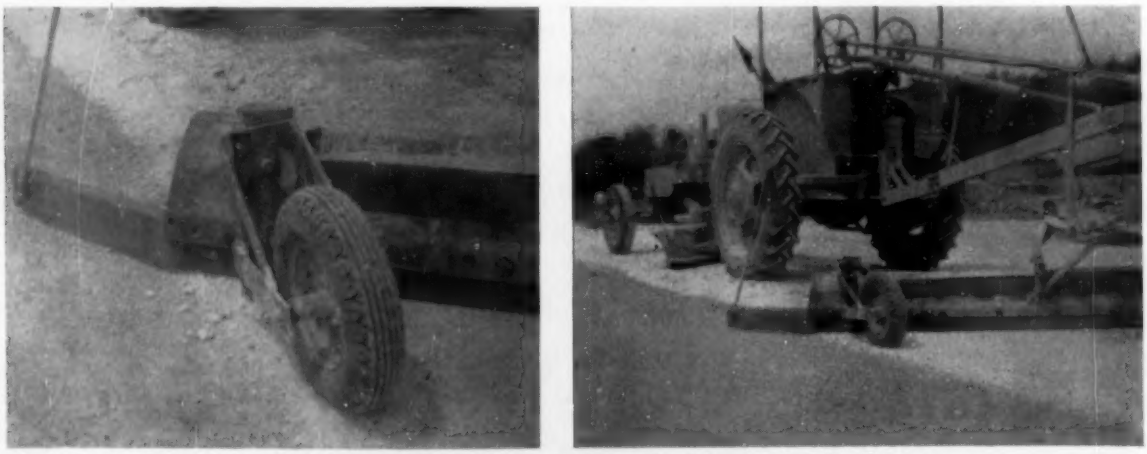
Wheel reduces blade wear on shoulder work

Maintenance men in District 7 (San Angelo) of the Texas Highway Department use small maintainers with tail blades for maintaining shoulders. The wear on blades next to the edge of the pavement has been high, and frequent replacement was necessary to enable a good clean-off job to be done.

A device that has greatly reduced blade wear is described by R. N. Jennings, district maintenance engineer, in the department's publication, "Texas Highways".

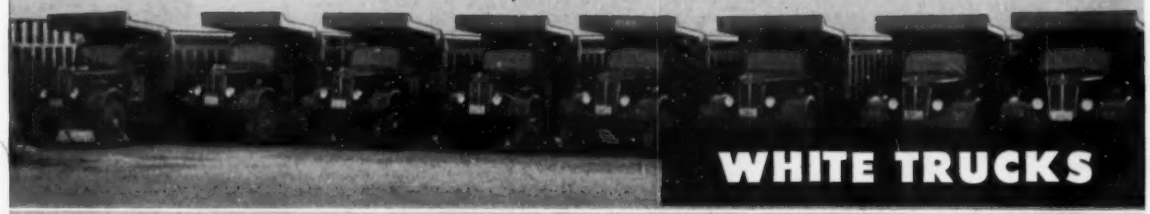
The extension of the blade prevents any material from tailing out around the forward edge of the drag.

A. M. Burrier and M. Hunsucker, skilled laborers, on the Department staff, devised an adjustable wheel arrangement on the motor grader moldboard to take the weight of the equipment. This equipment is here pictured.



● Wheel with adjustable bolt slot helps keep skimming blade at best elevation for economical shoulder maintenance.

Speed Delivery of Lightweight Slag at Hamilton because . . .



WHITE TRUCKS



ARE RIGHT



FOR THE RUGGED JOBS!

Look at this line-up of rugged Whites engineered right to the job for the Quigley Construction Company Limited at the new National Slag Ltd. plant at Hamilton. They transport thousands of tons of slag hourly in southwestern Ontario . . . on tight schedules . . . day after day.

Their outstanding record on constantly expanding service proves Whites have the quality and the engineering that gets more work done . . . faster!

Find out how you can have this same White dependability and low operating costs . . . have bigger payloads . . . do more work . . . in your business. See your White Representative.



One of the White six-wheeler dump trucks with 18 cu. yd. body (14' x 7') in the Quigley fleet.



"We tailor our Whites to the exact work they do . . . and they do more of it!"

. . . Robert P. Quigley, President, Quigley Construction Company Limited Bartonville, Ont.

"Over four years ago, we agreed to standardize on Whites," President Quigley says. "This move has paid off time after time in actual performance and economy of operation."

"Our drivers are as proud of our Fleet of Whites as we are, and this combination of quality in men and machines is a sure-fire one," he says.

Through city traffic, over-the-highway, and off-the-road, Whites are right for Quigley operations—from their Model WC-2262 dump trucks with 18 cu. yd. bodies, to the husky WC2462 PLT tractors with 32 cu. yd. dumping semi-trailers.

THE WHITE MOTOR COMPANY

Cleveland 1, Ohio

For More Than 50 Years The Greatest Name In Trucks

FIRST CHOICE White OF THE "PROS"

. . . for more details circle 257, page 14



20 out of 22 crawlers drive through torque converters

. . . and they're all Twin Disc!

Of the 22 crawler tractors working on the first section of the Indiana Toll Road now under construction—*20 are equipped with Twin Disc Torque Converter Drive!*

Why this top-heavy proportion of Torque Converter crawlers? Let's ask H. T. Lattimore, general superintendent for Suber & Co., of Whitmire, S. C., the contractor with the earth-moving contract for the first 12-mile stretch.

"We prefer Torque Converter crawlers," says Mr. Lattimore, "because they give us more usable power, and more power *means more work done every day.* The Torque Converters cut out engine lugging, cut down on shifting and clutching and make it a lot easier for our operators to match tractor power to the load. Operators move more dirt and are less tired after a full day's work on a tractor with Torque Converter Drive."

Throughout the construction industry, more and more contractors are carefully checking the performance of Torque Converter-equipped tractors . . . and arriving at the same conclusions! That's why *all three* of the "Big 3"—Allis-Chalmers, Caterpillar and International, manufacturers of the most powerful crawler tractors now available—have standardized on Twin Disc for their Torque Converter Drive models!

Be sure there is a Torque Converter Drive in the next tractor you order. Check with your dealer today for complete information on Torque Converter Drive — and the tremendous increase in *drawbar pull* it will give your tractors.

Photo — Excavating on the Indiana Toll Road, Suber & Co. is working ten HD-20, six new HD-21, one HD-15AC Allis-Chalmers and three TD-24TC International crawlers—a total of 20 out of their 22 tractors on the job *driving through Twin Disc Torque Converters!*

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

. . . for more details circle 252, page 14

Tractor-Mounted Drills — a Trend?

THE TREND toward crawler mounted self-contained drilling units has become increasingly evident, according to industry field surveys. Savings on equipment, time and man-power are encouraging widespread usage of this recently developed unit.

These mounted drilling units, according to a bulletin from Caterpillar, eliminate the centralized air plant and attendant and the compressed air pipeline. They also eliminate the possibility of air line breaks due to freezing, blasting, back breaks and collisions. Operator fatigue has been reduced and actual drill time increased due to the mobility of the unit and elimination of pipeline and air hose prior to the blasting operations. The units require a one to two man drill crew, eliminating the need for several men to move the compressor and drill wagon.

Such a unit usually consists of a track-type tractor with large front idlers, rear power take-off to drive compressor, one or two rock drills with 6 or 12 ft. feeds, an air receiver of sufficient volume, and a compressor unloader and engine throttle control. Occasionally a front cable control is used to adjust the drill mounting — either fixed or adjustable. In addition, it requires a two stage air compressor, air or water cooled, similar to those used on portable air compressors, 125 to 600 cfm of actual air delivery at 100 psi pressure. Auxiliary equipment includes an air line oiler, blow pipe takeoff, racks for drill rods, bits, blow pipe, extra hose, and tools.

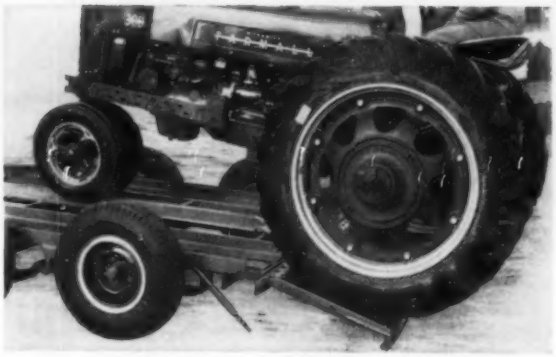
For wet drilling a water tank is mounted over one of the tracks, water pressure being obtained by a small air line from the air receiver. Many times, the air is piped

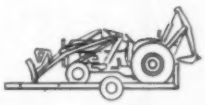


● A Caterpillar D8 tractor with Worthington 500 compressor on rear and two drills for 8 in. holes through limestone. Compressor is V-belt driven from power take-off.

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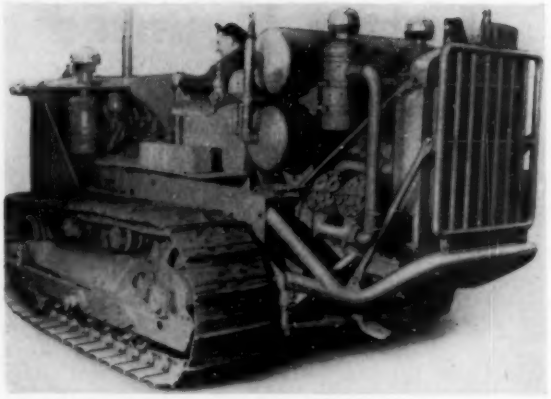
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● This Cat D8 Tractor is equipped with a LeRoi 600 cu. ft. per minute power take-off compressor and a heavy tubular steel frame for protection in rough country.

from the compressor and looped through the water tank, which then acts as an inter-cooler in summer and heats the water during winter operation. The water tank should be equipped with a safety valve.

The rigid support given by the hydraulic boom type operation has proven useful in ditch drilling, face drilling, and for other points not accessible to the tractor. The arm or mounting for a single rock drill is usually positioned and held by a hydraulic arm.

In some instances the front end drill mounting can be a "C" frame attached about the same as bulldozer arms and operated from a front cable control. In other cases the drill mounting itself provides for directional control. This mounting is adequate for most drilling operations where the drill pattern is constant.

New Tractors Often Used

Originally contractors thought that an old tractor with a fairly good engine could serve for this use. As experience broadened, it was realized that the application was so worthwhile that new tractors were purchased for the purpose. However, when only a self-propelled drill mounting is desired almost any track-type tractor is used. In this application the machine travels only a few hundred feet a day. No compressor is mounted on the machine and the air is brought to the drills by flexible hose from a nearby air line.

Caterpillar Tractor Co. reports that several compressor and rock drill manufacturers are prepared to supply a package consisting of compressor, drills, and mounting and brackets for mounting on Caterpillar track-type Tractors. These firms include: Gardner-Denver Co., Quincy, Illinois; Jaeger Machine Co., Columbus, Ohio; Joy Manufacturing Co., Pittsburgh, Pennsylvania; LeRoi Manufacturing Co., Milwaukee, Wisconsin; Worthington Corp., Harrison, New Jersey; Hart & Hart, Providence, Kentucky; Utah Sprocket & Machine Co., Salt Lake City, Utah; and Butler Sparks Co., Oklahoma City, Oklahoma.

● More than 400 employees of the Oklahoma state highway department have been presented with service pins for five or more years of consecutive or accumulated employment.

Three were honored for 30 years service, Charles E. Brewer, chief draftsman, Oklahoma City, Stansel Byers, assistant Tulsa division engineer in charge of construction and William H. Bell, assistant division engineer at Muskogee also in charge of construction.



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State Legislatures Didn't Do So Bad

By Duane L. Cronk

ENTHUSIASTIC reports of bigger-than-ever roadbuilding plans around the states are offsetting the dismay that struck the highway industry last month when Congress failed to produce the anticipated federal-aid program.

The revised optimism stems from news of aggressive moves by state legislators who have, within the last few weeks or months, approved fund sources for road, street and bridge construction running into billions of dollars.

"I think a number of people are surprised and encouraged at how much good-roads progress was chalked up in the state legislatures this year," Alfred Johnson, Executive Secretary of the American Association of State Highway Officials, said last week. "It probably reflects a growing public opinion movement that is going to continue to demand more of state and local governments."

• • •

It was predicted months ago that this spring and summer would find state legislators facing up to a rash of highway financing proposals. But until now, with all eyes on Washington, the results of the good-roads push in 44 state capitals have been overlooked.

Here is what has happened.

- A number of states launched new highway construction programs of substantial size.
- Thirteen states boosted gasoline taxes, some as much as 2c a gallon, providing an additional $187 million for roadbuilding.
- Twelve states authorized highway bond issues. Many more liberalized debt limits of cities and counties, thus stimulating bond financing for roads and streets on the local level.
- Ten states approved toll road projects or created toll authorities with multi-million-dollar projects in mind.
- Twenty-one states upped registration or license fees, indicating the willingness of motorists and users in those states to share in expanded highway programs.

• • •

Also BPR Reports That —

- Total contract awards for highways for the first six months of this year hit an all-time high.
- State and local governments have 30,851 street and highway projects ready-to-go, planned, or programmed, at an estimated cost of $10.8 billion. Taken from the Census Bureau's first comprehensive survey of non-federal highway construction plans, the figures indicate a high level of roadbuilding for some time to come.
- Traffic is still increasing, a phenomena that is bound to keep the need for highways before the public eye. The Bureau of Public Roads latest figures, those for May, indicate that use of the nation's rural roads is up 4.7% over 1954 levels and rising, with city traffic gaining comparably.

Long-Range Programs Launched

Some of the big state programs pushed forward by their respective legislations include those in Colorado, Connecticut, Louisiana, Michigan, New York, Ohio, Rhode Island, Washington and Wisconsin. These are a few examples:

Colorado adopted an all-time record budget for highways this season — $46.8 million, including $3.4 million for the Valley Highway in Denver.

In *Connecticut*, a $113 million roadbuilding program for the next two years has been approved. It is expected that a gas tax boost approved this session, plus increased federal aid will aggregate $100 million in the next two years. The program envisioned will be the state's largest so far. The General Assembly also authorized construction of five new toll bridges across the Connecticut River. The cost — $45 million.

Louisiana amended its constitution to permit a long-range highway program and to arrange for its financing. The legislators appropriated $30 million from the general fund and dedicated up to $20 million from oil, gas and mineral leases. It also approved a bond issue for $60 million subject to the vote of the people.

Michigan hopes to let the first contracts this month for construction and improvement work on a 2,000-mile arterial highway system authorized by the legislators for prompt attention to needs. A 1½c gasoline tax increase will help to finance it.

In *New York State*, the legislation gave the green light to a $2-billion, seven-year highway modernization program. It passed a bill approving the sale of $750 million worth of bonds to help finance it. A 2c boost in the gasoline tax and a 3c increase in the diesel fuel tax will help to retire the bonds. The legislators also gave the New York Port Authority and the Tri-Borough Bridge and Tunnel Authority permission to begin a $600 million program for improvement of the metropolitan area's arterial highways. Three toll bridges, costing a total of $379 million, are involved.

Ohio saw the kick-off, last month, of a two-year highway construction program that will cost an estimated $332 million. About $250 million would come from bonds.

The governor has expressed the hope that a second turnpike, crossing the state from Cincinnati to Conneaut, will be under way in a year. The 300-mile-long job would cost an estimated $400 million.

Rhode Island voters launched a new four-year, $70 million highway program this summer by approving a $30-million bond issue for financing.

In *Washington State*, legislators approved measures aimed at accomplishing nearly $750 million worth of roadbuilding and bridge construction. Some $500 million would come from toll financing.

Wisconsin lawmakers approved a bill designating 2,100 miles as an arterial highway system to be constructed and improved at a cost of $258 million. The act was the result of a two-year study. This year's program in that state is the largest in Wisconsin's history. It will call for work on 621 miles of highway and require an outlay of $65 million.

Gasoline Taxes Boosted

The 14 states that upped gasoline taxes include the following and their respective increases:

Alabama	6 to 7 cents
Connecticut	4 to 6 cents
Georgia	6 to 6½ cents
Iowa	5 to 6 cents
Maine	6 to 7 cents
Michigan	4½ to 6 cents
Montana	6 to 7 cents
Nevada	5½ to 6 cents
New York	4 to 6 cents
North Dakota	5 to 6 cents
Texas	4 to 5 cents
Vermont	5 to 5½ cents
West Virginia	5 to 6 cents
Wisconsin	4 to 6 cents

Toll Roads Boom Along

In 10 states, measures were passed to create toll authorities or to expedite construction of large toll projects.

Connecticut will market another $100 million worth of bonds this month to continue construction on her $398 million cross-state route.

Colorado authorized surveys for a toll road into the San Luis Valley.

Florida sold $74 million worth of bonds in June to start the Sunshine State Parkway between Miami and Fort Pierce. Construction will get under way soon on the 103-mile stretch. The legislation also approved the 238-mile section running up to Jacksonville — a $207 million job.

Idaho created the Idaho Turnpike Control to construct a 22-mile toll road closing the gap on the Lewis & Clark Highway. The cost $35 million.

Iowa created a toll road authority to construct a cross-state pike from Davenport to Council Bluffs. The 298-mile facility will cost about $180 million, it is estimated.

Maryland got the go-ahead for a 48-mile toll road from Baltimore to the Delaware state line. The Northeastern Expressway will cost about $29½ million and a bridge across the Susquehanna another $15 million.

Massachusetts designated a terminal for the cross-state route now under way, thus hastening construction toward Boston.

New Jersey authorized a cross-state connection between the North-South Garden State Parkway and New Jersey Turnpike. The 47-mile job will cost about $82¾ million.

Oklahoma OK'd an extension from the Turner Turnpike to the Texas line.

Pennsylvania approved another turnpike to cross the state's northern section. Paralleling the Pennsylvania Turnpike, the new 360-mile route (to be called "The Keystone Shortway") will compete for traffic between New York City and Chicago. Meanwhile, it is expected that construction will start in January on the 46-mile Pennsylvania Turnpike extension across Erie County. The cost — $62 million.

Texas sold $58½ million worth of bonds recently to build the Dallas to Fort Worth Turnpike, a six-lane, 30-mile-long highway.

Washington legislators authorized construction of the Everett-Seattle-Tacoma toll road at a cost of $227 million. Bonds will be sold in January.

All these accomplishments in state legislative halls promises a continuation of a record volume of roadbuilding, industry leaders believe. Referring to the record of financial gains, Arch Carter, Manager of Highway Division, Associated General Contractors of America, said recently:

"Contractors can't help but be cheered by what the states have done to spur roadbuilding this year."

• • •

Highway contract awards set an all-time record in June (last month available) for any one month, the Bureau of Public Roads reported last week. Awards by state highway departments and toll agencies amounted to $299 million in June 1955 compared to $263 million in June 1954.

For the first six months, contracts awarded by state highway departments amounted to $1,239 million, compared to $1,082 million in 1954.

Toll facility awards for the first six months were $376 million, compared to $182 million in the same period of 1954. Toll and state highway awards combined thus were up nearly 28% over the first half of 1954.

• • •

Traffic trends, still breaking all records, are still in the public limelight. This May American motorists and truckers rolled up nearly 29 billion vehicle-miles. And the new highways keep generating more.

Examples: Traffic on the 118-mile New Jersey Turnpike jumped 9.6% in the first six months over the first six months of '54. More than 12 million vehicles paid a toll of $9.9 million to use the facility. The unplanned-for load is necessitating the widening of 61 miles.

The New York Thruway's first year of operation (It is still not fully open) brought revenues of $7.1 million from 8.7 million vehicles.

Highway leaders are determined that this year's failure to see a big national roadbuilding program launched will not be repeated next year. Several Congressmen have already drafted compromise bills to introduce at the next session in January. President Eisenhower, "deeply disappointed" by failure of the House to enact legislation for highways, has said that he will not be contentious over the method of financing. Editorial writers across the nation have deplored the delay and, undoubtedly, some Congressmen are already wishing they had voted in the public interest.

These are all good signs. The National Good Roads Association, whose executive officers met in Washington last month, is considering how it can do on a national level what its member organizations have accomplished in the states. If it, and other good roads organizations, are anywhere as successful with Congress as with state legislators, next year could still see a federal-aid program of the scope so sorely needed. Right now, it looks like the states set the pace in 1955.

Legislators Also Authorized Highway Bond Issues

Alabama	— $ 50 million	— For roads and streets
Georgia	— $100 million	— To pave country roads
Illinois	— $245 million	— For expressway construction
Louisiana	— $ 60 million	— For new long-range highway work*
Michigan	— $230 million	— For limited-access highways over next 3 years.
Minnesota	— $ 20 million	— For bridges and approaches.
Mississippi	— $ 18.2 million	—
New Mexico	— $ 20 million	— For state highways
New York	— $750 million	— For long-range highway program*
North Dakota	— $ 54 million	— For state highways*
Rhode Island	— $ 30 million	— For long-range highway program
Vermont	— $ 12 million	— For federal aid matching money and to improve gravel roads.
Washington	— $ 4.3 million	— For county roads in Columbia Basin

* Subject to vote of the people this fall.

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TORQUE CONVERTER OR DIRECT DRIVE

By Kenneth F. Park

Earthwork Engineering Consultant San Leandro, California

RECENT introductions of a considerable number of new tractors, available both in conventional drive and the newer torque converter drive, pose the buying questions: "Which?" and "Why?" Purchasers will probably tend to flock to the newer converter drive, in the hope that some enchanted mechanism will end all their troubles.

Disappointments already have developed, occasioned generally by a lack of selling and buying "savvy." The buyer, obviously, cannot hope to know all of the mechanical and operational characteristics of the new machines. Most of the sellers, who should be experts, are not well enough informed to analyze the application or the need. The resulting application is often a misfit. The situation is an unnecessary one.

Ignorance is a harsh term to apply to a lack of proper information, but in truth ignorance is the cause of a great deal of unsatisfactory buying.

Since ignorance never settled a question, suppose we try to shed a little light into dark places. The first development of the torque converter as a means of transmitting power, and now its apparent popularity, is the result of a need — a series of needs — maybe some hopeful wishing. The idea is not new, nor is its use in construction equipment of recent origin. The writer saw his first converter-driven tractor 20 years ago — and the idea was not new at the time.

With the long-ago introduction of gears, the multiple ratios of a mechanical transmission were designed to eliminate the losses of horsepower by keeping up engine speeds. In purchasing horsepower for performance, a buyer has always had to keep an engine working close to governed speed in order to obtain best performance. Any transmission which lugs an engine under load, lowering speed, deprives the owner of full horsepower output.

While the mechanical efficiency of a mechanical transmission is greater than that of a torque converter, there always have been areas of inefficient horsepower use between gear changes. Power demands of varying degrees, even on the same identical job, have always worked tractor engines harder as they have had to lug down. Accompanying such engine inefficiency has been the fatiguing, extra gear manipulation for the operator.

Constant HP Maximum

Opposed to the manual work of adapting a multiple divisioned, direct drive mechanism to varying output demands is that of the torque converter, which allows the engine to operate at nearly constant governed speed to develop maximum horsepower at all times. Thus, the torque converter does, through its infinite range of ratios, what a mechanical transmission does at maximum efficiency in the course of its step-by-step shifts.

Mechanically, application-wise and for operator comfort, the torque converter machine is capturing the fancy of contractors, mechanics and "skinners." Much of it is justified — a lot of it is going to simmer down as greater familiarity with the application is developed.

What is the torque converter? What is the direct drive?

The torque converter is a fluid drive through which all power is transmitted between the engine and the transmission by the flow of oil. As the fluid travels through the converter the output torque accumulates until it is increased as much as five times input torque. Through all this increase in drawbar pull there is no increase in output horsepower. (Incidentally, torque is that which produces or tends to produce rotation. Naturally tractor travel and power depend upon rotations. The rotation of gears, shafts, wheels, tracks, etc.)

This accumulative process is the means by which such enormous quantities of draft become available at very low speeds just short of a stall. The changing character of work loads affecting the angle at which the fluid strikes the turbine blades, creates the automatic response that must otherwise be made manually in a mechanical transmission. The infinite number of increments, from zero miles an hour to the top speed of any gear, smooths out power transmittal and reduces wear and tear on machinery.

Two or three speed ranges typify the present day torque converter driven tractors. Each successively higher gear range starts at zero miles an hour, with lower draft ratings — and travels to higher maximum speeds.

The direct drive as opposed to the torque converter drive replaces the fluid connection with a friction clutch. This solid coupling replaces the use of the fluid and varying power requirements are obtained by a number of gears (from 4 to 10) stepped up in increments of considerable separation.

Costwise the torque converter tractor is higher priced. The amount seems to run from about 7% to 10%.

Repair costs are not yet sufficiently available for comparison, but it is judged these will be about the same for both tractor types. For the torque converter tractor, uniformly faster engine speeds indicate shorter engine life. It can be seen, however, that eliminating shock loads and the extreme heat occasioned by lugging down can result in longer machine life. So, repair costs may be similar in the two types. Through the years,

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however, opposed to general opinion, engine life has generally been found to be shorter in torque converter applications.

Each Has Limitations

In use, each machine has some limitations compared to the other. In a track-type machine of this character it is necessary that it operates at near governor speed. It should also deliver maximum horsepower over a wide range of power demands.

The torque converter machine makes this maximum horsepower delivery at all times over the roughest terrain. There is no gear-shift guesswork. The operator makes contact with his work, opens the throttle and relaxes. As the load increases or decreases, the varying torque required is selected and exerted automatically by the torque converter. No clutching and de-clutching, no wrestling with gearshift levers, no shocks, no jolts, But — this machine needs at least 25% more engine horsepower to obtain as much speed at a given power demand. Or, at a given speed, to put out as much push or pull. This is occasioned by the inefficiency of torque conversion. An efficiency factor of at least 80% must be applied to engine horsepower to arrive at a proper evaluation of maximum performance compared to that of direct drive machines. The average operating range falls somewhat below this figure.

With torque converter tractors, proper gear selections must be made in relation to work demands or the machine becomes more inefficient because overheating occurs. If power demands are too light and the output RPM attains, or approaches, the same velocity as the input RPM, the machine can suffer serious damage, again through the development of heat. Other precautions in its use must be recognized, such as the fact that it cannot be left in neutral with the clutch engaged for long — or damaging heat develops.

These characteristics don't mean that the system is particularly temperamental or has "bugs." It does mean learning to use it in an entirely different manner than that customarily employed in direct drive machines. Operators and mechanics will need special instruction in use and maintenance. Performance and cost analysts must also re-evalute these machines in terms of some already mentioned characteristics as well as some yet to be discussed.

The direct drive tractor is so well known by now that limitations need little discussion. The greatest difference between direct converter drive lies in the need for good gear selection and juggling, compared to the almost eliminated need for the same work with the converter.

An estimate of relative application preferences will help place either system in its proper category. Probably this column classification will prove sufficient but a little later discussion of some of the reasons for the arrangement will clarify the contentions. Many of these factors are general. Others must apply where similar or identically sized machines, or horsepower, are to be considered.

Check Sheet for Comparing Drives

Factor To Be Considered	*Torque Converter*	*Direct Drive*
1. Investment	higher	lower
2. Cost to own and operate	higher	lower
3. At any given speed, same HP	less DB pull	more DB pull
4. At any given DB pull — same HP	less speed	more speed
5. DB Pull at near-zero speed	Increasing	falling off
6. Number of gear changes	Infinite	Restricted (4 to 10)
7. HP to make identical performance, at least	125%	100%
8. Efficiency on most work	Satisfactory	Satisfactory
9. Fuel consumption, varying — but about	125%	100%
10. Mechanical efficiency	lower	higher
11. Operator preference	divided	divided
12. Synchronization with direct drive	excellent	good
13. Bulldozing	good	excellent
14. Clearing	good	excellent
15. Rooting, ripping	good	excellent
16. Logging	good-improving	excellent
17. Cable laying	good	excellent
18. Compaction, sheepfoot or others	good	excellent
19. Push loading	excellent	good
20. Pipeline laying	excellent	good
21. Sideboom crane or winch	excellent	good
22. Loader-equipped	excellent	good
23. Dragline, back-hoe or shovel equipped	excellent	good

Factors Discussed

A cursory appraisal, or recap, of each item follows:

1. Investment. In tractors of similar size or horsepower, the torque converter machine exceeds the direct drive in cost by about 7% to 10%.

2. Cost to Own and Operate. Sufficient figures are not available to accurately evaluate the repair differences. Since much of costs figures, however, is directly relative to the investment, the torque converter machine will be higher.

3. Drawbar Pull. With identical flywheel horsepower the torque converter machine will deliver less pull, at any given speed, except near-stall, than a direct drive. This is occasioned by the inefficiency of the torque converter.

4. Speeds. The same is true in the delivery of speeds when identical drawbar pull is required.

6. Number of Gear Changes. This subject has been discussed pretty thoroughly in several portions of this paper. The comparison however is that of an infinite selection in one as against the restricted four to ten with the other.

7. Horsepower. The efficiency losses of the torque converter make it necessary to have at least 25% more horsepower in order to deliver the

5. Drawbar at Very Slow Speeds

When a power demand exceeds that of the lowest gear of a direct drive tractor its torque rises and about a 10% increase in drawbar pull results, at a proportionately slower speed. Beyond that point power drops off and the engine will quickly stall.

Not so with the torque converter. The pull keeps increasing until the tractor has no further forward motion, or the tracks spin. As the tremendously increasing drawbar pull develops, it becomes proportionately necessary that weight be added.

Full pull will not be produced in good footing unless the weight on the tracks exceeds the expected drawbar pull by at least 11%. This generally becomes impractical because of the detrimental effect on all other performances whose travel speeds exceed the extremely low one.

19. Drives Compared for Push Loading

The loading of a scraper is pretty much a varying power demand. So much depends on the operator handling the scraper. The converter driven tractor will respond to the inevitable variations in loading speeds better than a direct drive.

The direct driven tractor is apt to push in more earth while the travel is of unvarying speed. It lacks the quick response, however, of the converter where a scraper tends to lug down then speed up, as the blade is lowered or raised. The direct drive is considered better, however, in very soft material where "pumping" is resorted to for the attainment of greater loads.

The direct drive, though, does not have the rapid acceleration to assist the scraper after loading through its first gear changes and departure. All in all the converter tends to create a little better scraper performance.

same drawbar pull at the same speed as the direct drive machine. Some other small losses occur so a figure in excess of 25% is better.

8. Efficiency on Most Work. Either machine will work on any job. Better on some, worse on others. Probably the over-all adaptability of either will make it a satisfactory purchase. At least, the direct drive is never far wrong, and in general, where a power demand is constant — or unchanging — is preferred. The efficiency is better — the probability of mechanical trouble arising considerably less.

9. Fuel Consumption. Taking two identical engines and placing one in a torque converter tractor and the other in a direct drive machine, the torque converter tractor will use an average of 25% more fuel. In other words, the extra fuel is for running the torque converter. Any further change in horsepower — up or down — will result in fuel consumption in direct proportion to the increase or decrease.

10. Mechanical Efficiency. Too many technical explanations are involved in a discussion of this character to warrant attempting it. Enough that manufacturers of torque converters acknowledge the greater mechanical efficiency of a mechanical transmission.

11. Operator Preference. As with every new machine, there are ardent admirers and just as vehement aversions. Probably the preponderance of preference is for the direct drive until such time as familiarity builds up for the torque converter. There is little doubt that the torque converter machine reduces the labor of accomplishment if that is all an operator thinks about.

12. Synchronization. When working together, the rapid coordination of a torque converter tractor to the variable speeds of any direct drive machine, or to one of its own kind under varying output, makes it superior. Any variation of RPM, efficiency or work demand between two direct drive machines results more nearly in both of them becoming less efficient.

13. Bulldozing. The tendency with a converter driven tractor is to hang up more readily, then as pressure is removed to jump into a high rate of travel commensurate with its engine speed. The tendency can make for danger around cliffs or high places. This characteristic is greatly reduced in some of the converters now available. The lugging character of the direct drive is presently judged to set up more performance in very difficult work. Possibly the other machine is faster in easy work.

14. Clearing. Here heavy work is performed with ponderous, slow motion and the direct driven machine is judged superior.

15. Rooting. Another job requiring slow motion power in which the direct drive is considered better. As with bulldozing, clearing, logging, the tendency to "hang-up" occurs and the sure forward motion of direct driven power as against the tendency to stop even while the engine is turning up, suggests the direct drive.

16. Logging. For retarding down hill travel, some of the earlier converters offered no change in setting up the equivalence of the compression of direct drive machines. This was a bad feature when hauling down steep grades with a skidded load. Recent developments in converters simulate or improve compression retardation with a lock at a 1:1 output to input RPM ratio. To this is now added a retarding effect from within the converter itself. So the application is improving even as the direct drive still seems the favorite.

17. Cable Laying. This work may be considered that of a nearly constant-travel load in which the direct drive is considered better. Some correction to this preference may be made by a perfect gear selection for a converter drive.

18. Compaction, Sheepfoot Rollers, Others. Another nearly constant power demand that requires a perfect converter gear selection of greater inefficiency and heating develops. The direct drive is preferred.

In Conclusion

It should be noted again, that either system of power transmittal will work in any one of the above activities. The torque converter is better for rapidly changing power demands, the direct for sustained. As for an overwhelming superiority in a job where there are no clear-cut indications for the need of one in preference to the other, taere will be a questionable benefit in the choice of one to the exclusion of the other.

20. Pipe Line Work. Such tasks wherein the tractor is "laying in" heavy loads with what must be smooth controlled travel power, the converter is considered excellent. No direct driven power has the smooth response so much desired in this business.

21. Sideboom Crane, Winch. Smooth travel control is again a requirement in this work. The variable but controlled character of the converter ranks it as better.

22. Loader Equipped. A tractor with a loader on it needs smoothly applied crowding power to make it perform well. The torque converter here again furnishes this kind of performance better than a direct drive.

23. Dragline, Shovel, Back Hoe. Typical of the several previously mentioned activities are these. The same thinking applies in which the torque converter machine is considered better.

Whichever machine is chosen, today's new versions are terrific — the best the contractor has ever had from which to choose. If there must be a choice, look at the predominating work demand which can be calculated. Search out the operating characteristics that point to one or the other. Don't be fooled by uninvestigated selling claims — a horsepower will do as much work for one manufacturer as another and cares little for whom it works. Pick a product made by a reputable manufacturer. Choose a well-informed distributor whom you can trust to serve you well.

If you will do all these things, you won't make a very serious mistake whichever way you turn — and your regrets will all be little ones!

MONEY-SAVER FOR MUNICIPALITIES



Fordson Major Diesel Tractor

Municipalities—and county, township and state governments, too—are making their dollars work harder by investing them in Fordson Major Diesel Tractor power. And for good reasons!

First, this versatile tractor meets dozens of different public works needs. Almost every department can use it to save money and manpower. Equipped with a backhoe, for example, the Fordson Major will lower the cost of installing and servicing water mains and sewer connections. Equipped with a front-mounted loader, it will speed loading of sand and gravel, clean up around excavating jobs, load snow and distribute salt. Other low-cost attachments equip the Fordson Major for all sorts of lifting, hauling, mowing and grading jobs.

Next, this tractor is exceptionally easy to handle—little operator experience or training needed. It's highly maneuverable, too, for work in close quarters and inside buildings.

Best of all, the Fordson Major is priced low. You get 40.6 belt and 36.3 drawbar horsepower for hundreds of dollars less than you'd pay for competitive diesel tractors with similar power and equipment.* You'll save every day on fuel, oil and upkeep, too.

Your nearby Ford Tractor and Equipment Dealer will give you complete information about how a Fordson Major Diesel Tractor can stretch tax-dollars for your municipality. Call him soon.

Based upon comparison of suggested list price at port of entry with published suggested list prices of competitive tractors f.o.b. factory.

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For better blading use a Fordson Major and rear blade to level berms, mix aggregate, grade, backfill and ditch. Fast, easy hydraulic operation.



Scarify this easy way with a Fordson Major and quick-attached implement. One man can scoop, scarify, level and backfill from the tractor seat.

. . . for more details circle 203, page 14

DIGEST of Current Technical Literature

By JOHN C. BLACK, Associate Editor

Noise measurement and control

Legislation and court decisions, supported by medical testimony, tend increasingly to make equipment owners responsible for auditory damage caused by noise. Quarry and mining operations are notable examples.

Ninety decibels is commonly stated as the limit of tolerance. What is a decibel? "It is not a measure of intensity in the ordinary sense but rather an indication of the ratio of one given sound pressure, as compared with another."

The usual reference level is at the threshold of hearing, the point at which the average human ear first has a sensation of hearing. This has been established as a pressure of 0.0002 microbar. The table shows a comparison of intensities at the different decibel levels.

Decibels	*Intensity*
150	1,000,000,000,000,000 (quadrillion)
140	100,000,000,000,000
130	10,000,000,000,000
120	1,000,000,000,000 (trillion)
110	100,000,000,000
100	10,000,000,000
90	1,000,000,000 (billion)
80	100,000,000
70	10,000,000
60	1,000,000 (million)
50	100,000
40	10,000
30	1,000 (thousand)
20	100
10	10
0	1 .0002 microbar

In this relationship it is seen that a reading of 30 decibels indicates an intensity 1,000 times greater than the reference level, or threshold of hearing; 60 decibels an intensity 1,000,000 times greater; 90 decibels one billion times, and so on.

Two machines, each generating 90 decibels of noise, produce not twice 90 decibels, but twice the intensity indicated by 90 decibels, or 2 billion times the reference level. It can be seen from the table that reduction of a noise level from 120 to 110 decibels eliminates 90% of the original noise intensity, and a reduction to 100 decibels eliminates 99%.

A small sound level meter, sufficient for the uses indicated in this article is available for about $150. Much corrective work, however, can be done simply by ear. Sound specialists should be employed in extreme or complicated cases.

Simple means for practical sound reduction include improved exhaust pipes on stationary machinery, attention to mufflers on trucks, wooden enclosures either around equipment or around the operator, baffles to interrupt the direct fall of aggregates on metal, reducing the height from which aggregates are dropped, an old truck tire used as a spreader or top of a gyratory crusher, chute covers of either metal or plywood in place of ordinary safety screens, rubber mountings for vibrating equipment, the placing of small angle irons across a chute to trap the falling fines and so provide a sound-deadening cushion, the use of ear plugs where better means can not be found, and, logically, that manufacturers take more responsibility.

"Practical Aspects of Noise Control in Crushed Stone Plants" by Alfred B. Hoftiezer, Laverack & Haines, Inc., Buffalo, N.Y., PIT AND QUARRY, 431 S. Dearborn St., Chicago 5, Ill., May, 1955.

Concrete mix design and quality control

British concrete practice is treated in this 548-page symposium with 121 diagrams and illustrations. Included are both original papers and discussions from the London meeting of May, 1954. Major divisions are:

A. Basic principles of design as used in the United Kingdom. Types of mix used for various building purposes.

B. Design of mixes for specific purposes, such as high compressive strength, flexural strength, abrasion resistance, etc. Classification of natural sands for mix design purposes.

C, D & E. Control of concrete quality, starting with a review of the present position and leading up to more specific aspects of the subject, such as the application of quality control.

F. Some of the problems involved in the destructive and non-destructive testing of concrete. Application of statistics to concrete quality. New methods specifying concrete, to bring specifications into line with current knowledge of mix design and quality control.

Sponsors of the meeting: the Cement and Concrete Association in conjunction with the Prestressed Concrete Development Group, the Reinforced Concrete Association, and the Research Committee for the Cast Stone and Cast Concrete Products Industry.

"Proceedings of a Symposium on Mix Design and Quality Control of Concrete"; Cement and Concrete Asciation, 52 Grosvenor Gardens, London S.W.I., England, 1955. (Price in U.S.A. $9.50 postpaid. Make remittance payable to the Association.)

Traffic engineering in Peoria, 1954

"In December, 1953, Peoria, Ill., hired its first Traffic Engineer, and this is the story of the first year of traffic engineering in this city of 113,000 population, with 1,570 intersections and 230 miles of streets within its 14 square miles." Achievements are outlined and before-and-after comparisons are made.

Four Divisions comprise the Department — Administrative, Maintenance, Parking, Electrical. An organization diagram is given.

The budget for 1954 was as follows:

Administrative Division	$ 7,338
Maintenance Division	37,804
Parking Division	47,288
Electrical Division	46,020
Street Sign Installation	30,000
Traffic Signal Installations	38,628
TOTAL	$207,078

Note that $68,000, approximately one-third of the total budget, was for the special items of sign and signal installation. Also note that the Electrical Division is responsible for the maintenance, upkeep, repair, and modernization of all electrical facilities of the City of Peoria except street lights. Included are all city buildings, bridges, police and fire alarm systems, and traffic control devices.

Only three traffic fatalities occurred in 1954 — the fewest since 1929, when accident reporting began, and a 77% reduction from 1953, when 13 persons lost their lives. Total accidents were reduced 6% and pedestrian accidents 12%. Based on National Safety Council estimates, the savings to the community by these reductions

amounted to $300,000.

One factor in the improvement was a campaign conducted through radio, TV, and newspaper publicity to obtain cooperation in the elimination of hazards caused by high hedges, weeds, shrubbery, and other restrictions to visibility.

Notable among other accomplishments under the new set-up were the modernization of traffic ordinances, a drastic but judicious reduction in the number of stop signs at street intersections, improved and simplified school crossing provisions, requirement that off-street parking space be provided for all new buildings, establishment of a low-fee parking area near the central business district, and (vitally important) the development of good public relations.

"One Year of Traffic Engineering in Peoria" by Daniel J. Hanson, City Traffic Engineer, Peoria, Ill. TRAFFIC ENGINEERING, *Strathcona Hall, New Haven 11, Conn., May, 1955.*

Seeding and mulching of highway slopes

One general paper and three special reports give methods, results, and unit costs of seeding and mulching operations. Equipment is described. Long distance blowing of seed and mulch was method generally used. Asphalt emulsion, alone or with straw, proved widely successful in spite of disappointments in certain specific cases. Seeding immediately after completion of earthwork is usually economical, even though it may require repair after paving is done. In West Virginia, the application of mulch first and seed second was considered more effective than the reverse order. Application of fertilizer is treated at length.

The reports on seeding and mulching occupy the equivalent of 29 typed pages, including pictures. Other papers bound with them are "Fertilizing and Seeding with Compressed Air," "Progress Report of Committee on Mowing and Herbicides," "Chemical Weed Control along the New Jersey Turnpike," "Establishment of Crown Vetch and Birdsfoot Trefoil on Highway Slopes with Various Companion Grasses and Rates of Seeding."

"Erosion Control on Extremely Sandy Soils" by Mark H. Astrup, Landscape Engineer, Oregon State Highway Dept. "Erosion Control on Extremely Sandy Soils in New Jersey" by Clarence R. Pell, Parkway and Landscape Engineer, New Jersey State Highway Dept. "Seeding and Emulsified-Asphalt Mulching on Road in North Carolina" by James A. Saunders, Assistant Landscape Engineer, North Carolina State Highway and Public Works Commission. "Soil Stabilization of West Virginia Turnpike" by Maurice A. Mendel, Supervisor of Roadside Development, West Virginia Turnpike Commission. REPORT OF COMMITTEE ON ROADSIDE DEVELOPMENT, *Highway Research Board, 2101 Constitution Ave., Washington 25, D.C., 1955. (Price 90 cents).*

Reinforced concrete after 90 years

Wire rope reinforcement in a two-story dwelling in England was found well protected and in good condition when the building was razed to make way for new construction after approximately 90 years service.

Design was in accordance with the "Wilkinson Patent," providing for reinforcement in tension areas. Precast hollow plaster blocks were used between reinforced concrete beams in the ceiling. Illustrations include design details and photos before and after demolition of the house was started.

"Early Reinforced Concrete in Newcastle upon Tyne" by Prof. W. Fisher Cassie, MAGAZINE OF CONCRETE RESEARCH, *52 Grosvernor Gardens, London S.W.I., England, March, 1955.*

Sonic tests for concrete strength

An algebraic equation and nomograph are presented for the prediction of the compressive strength of concrete from its sonic properties. Magnitudes of these properties were found to depend not only on the age and curing of the specimen but also on its size.

In comparing dynamic modulus of elasticity with static modulus of elasticity it is noted that: "In a dynamic test the strains are generally very low and the computed dynamic modulus of elasticity is often considered as being the same as the initial tangent modulus of the ordinary stress-strain curve. Thus, it is larger than the modulus of elasticity determined from a static test. The static modulus is actually an average modulus over a relatively large range of strain."

Certain unexplained variations in dynamic modulus according to age of specimen and method of curing are treated empirically to give practical results. More research is recognized as necessary.

One advantage of sonic testing is that the same specimen may be used later for tests of creep, fatigue, and other properties. An empirical method is presented for converting the sonic properties of specimens of any size to those expected of a standard 6-in. by 12 in. cylinder.

"Utilization of Data Obtained in Sonic Tests of Plain Concrete," by C. E. Kesler, Assoc. Prof. of Theoretical and Applied Mechanics and T. S. Chang, Research Associate, University of Illinois, PAPER No. 55-S-3, *presented at the ASWE meeting, April 18-21, 1955. The American Society of Mechanical Engineers 29 W. 39th St., New York 18, N. Y.*

Ball test vs. slump

Penetration of a 6-in., 30-lb. ball provides a test for concrete consistency corresponding in accuracy with the slump test, but simpler and much faster to make.

Less operator skill is required. "The slump test is subject to personal differences in sampling, rigidity and smoothness of base, dampening the apparatus, filling the cone, rodding, raising the cone, freedom from jarring, and selection of point to which the slump is measured. The principal possible source of error in the ball test — the rate of releasing the ball — can be quickly detected in case of dispute if the opposing observer also makes the test, lowering the ball gently as recommended. With reasonable care in observing, error in reading the scale to the desired precision (0.1 in.) is negligible.

"It is often desirable to test the concrete en route to or in the forms. With the ball, tests can be made at the mixer, in the receiving hopper, in wheelbarrows or carts, and in the forms; thus segregation and/or stiffening can be traced . . .On a pavement job in the state of Washington, premature stiffening was traced by ball-testing the concrete at intervals during and after the finishing operations, whereas use of the slump test would have required 'disturbed' samples in which the stiffening would be lost."

Apparatus and procedure are described and illustrated. There is no patent, and the equipment can be made easily in any shop. An appendix carries a detail drawing and full instructions for preparing samples and making tests.

Use of this test is increasing rapidly, and ultimately it may supplant slump in specifications.

"Ball Test for Field Control of Concrete Consistency" by J. W. Kelly and Milos Polivka, JOURNAL OF THE AMERICAN CONCRETE INSTITUTE, *18263 W. McNichols Rd., Detroit 19, Mich., May, 1955. (Price $1.50.)*



sealing paving joints on

OHIO'S "MILLION-DOLLAR-A-MILE" TURNPIKE

with cold applied

PRESSTITE No. 77

All longitudinal and transverse joints in completed sections of the Ohio Turnpike have been sealed with Presstite No. 77. Selection of this cold applied rubber base sealer was based on successful experience of Ohio's Department of Highways, which has used No. 77 in large volume since 1951 with outstanding results.

Experience has proved that No. 77 remains flexible, resilient and adhesive longer, and forms an impervious barrier against passage of water through joints into the sub-grade better than any other type of joint sealer. It remains tough and elastic from sub-zero temperatures up to 140°.

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PRESSTITE SEALING COMPOUNDS

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. . . for more details circle 237, page 14

Fatigue tests of steel beams at — 70° and — 40°F.

Contrary to much popular belief, mild steel beams were formed to resist fatigue better at low temperatures than at normal. This applied to all beams tested — 10-in. WF, 21 lb. per ft. rolled I beams; welded beams; and riveted beams of similar section. All specimens were 14 ft. long, tested on a span of 13 ft.

The authors warn that since the tests were of limited scope, it would be improper to draw too definite conclusions as to the relative merits of the rolled, welded, and riveted types beyond the range tested, especially regarding thickness or size.

It is noted that yield point of some steels rises as temperature falls.

Fatigue tests were carried to the beginning of failure. At + 70°, welded beams of "killed" steel lasted through approximately 200,000 cycles, while the rolled sections failed around 100,000. On the other hand, at —40° the rolled beams were well in the lead with a maximum above 500,000 cycles and an average close to 400,000, or about 4 times the cycle life at normal temperature. It is noted that the yield point of some steel rises as the temperature falls, as against 300,000 for welded beams of either "killed" or "rimmed" steel. Riveted beams survived only about 50,000 cycles at the higher temperature and 130,000 at the lower, but proved about 13% stronger than the other two types under static test.

All fatigue tests were carried out with a maximum cycle stress of I 26,000 psi, corresponding to a strain variation in the extreme fiber of about 870 uricro-inches per inch. Loads were applied twice in a cycle, and at a rate of 165 cycles per minute. Testing equipment and operations are described in detail and well illustrated.

Regarding welded beams it is noted that "the joint between web and flanges does not behave any differently than the same joint in a rolled beam, or than the corners of the angles in a riveted beam."

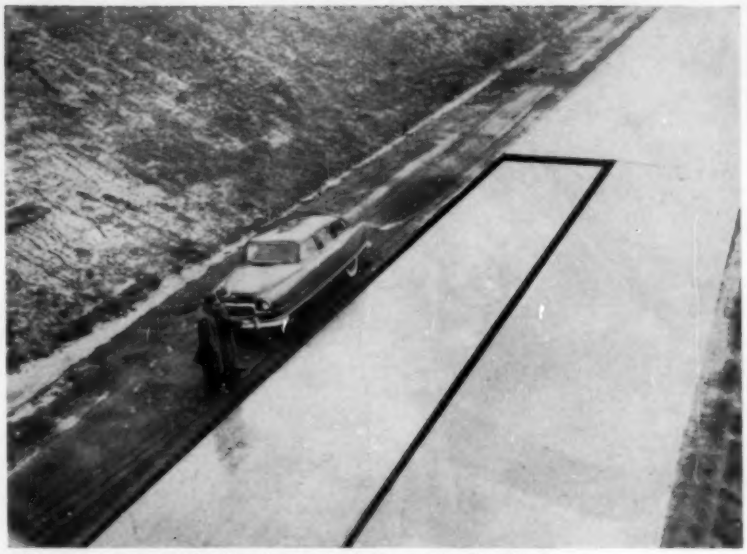
These tests were sponsored by the National Research Council and the Canadian Institute of Steel Construction, and carried out at Ecole Polytechnique of Montreal — 1952-1954.

"Fatigue Life of Steel I-Beams at Normal and Sub-Zero Temperatures" by J. Dubuc, Associate Professor, Dr. T. A. Monti, Consultant, and Dr. George Welter, Professor of Applied Mechanics, Ecole Polytechnique. THE ENGINEERING JOURNAL, *The Engineering Institute of Canada, 2050 Mansfield St., Montreal, Canada, May, 1955.*


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The Northwest Model 41 is built as a full 1 yd. Crane from the ground up. It brings you all the Northwest advantages and is fully convertible from Shovel to Crane, Dragline or Pullshovel. If you need a full 1 yd. machine, capable of delivering the service you have a right to expect from a 1 yd. rig, be sure to get full details on the Model 41 before you buy.
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Thruway Bridges Get Silicone Treatment

Water repellant chemical applied on pavement test area and on many Thruway bridges, as part of toll road's long-range maintenance program.



● Pavement area tested with silicone is shown outlined in black.

WHAT is undoubtedly the largest-yet application of silicone treatment of highway pavement and structures, has taken place recently on the New York State Thruway. Bids were taken this past spring on some $30,000 worth of the chemical, which has been applied to deck pavement on all of the 160 bridges carrying thruway lanes.

Of the 500 thruway system bridges including ramp structures, six have shown marked indications of pavement scaling, according to a spokeman for the Thruway Authority. These deck surfaces were replaced with asphalt concrete, type 2B, New York state specifications. Another six or so may be repaved in whole or in part in 1956. This represents all the bridges on the Thruway on which scaling has developed beyond the need for local area patching.

This is but one part of a broad program of waterproofing adopted for the Thruway's physical plant, which traverses a region of severe winters involving many cycles of freezing and thawing and large-scale and prolonged use of de-icing chemicals and abrasives. The program anticipates ultimate replacement of all faulty expansion joints and structural cracks. Announced Thruway policy is to take every reasonable precaution in maintenance of its bridges to safeguard them against the elements for maximum life and economical service.



● Applying silicone materials with the spray bar.

From the beginning, in 1946, the Thruway has been designed and built to standards and specifications of the state department of public works. At first, a blend of natural cement and portland cement was used for roadway pavement as well as bridge structures. The mixture of cement is known to produce air entrainment in the concrete.

Subsequently, the state department adopted Type 2A air entraining cement for highway pavement and later for bridge pavement as well, although it is understood that the only Thruway bridge utilizing air entraining portland cement concrete is the Hudson River bridge now nearing completion. Putting it another way, all thruway bridges completed to date have either a blend of natural and portland cement in their pavements or are constructed with pavement made with Type 2A or 1A cement. Presently all structures being designed and built will have Type 2A or 1A cement, according to the Authority.

According to F. William Davidson of the Thruway Authority, bridge pavements appear to be more vulnerable to scaling than highway pavement due to a number of factors in-

cluding: thinner cross-section, vibration, retention of salt brine by flanking curbs and possibly insufficient air entrainment from the natural cement used as an agent.

As to the main-lane pavement on the 427-mile Buffalo to New York toll road, all but an early pre-bond-issue 4-mile section near Rochester and another short section south of Albany is paved with air entraining portland cement concrete. The principal concern has been over the bridge decks.

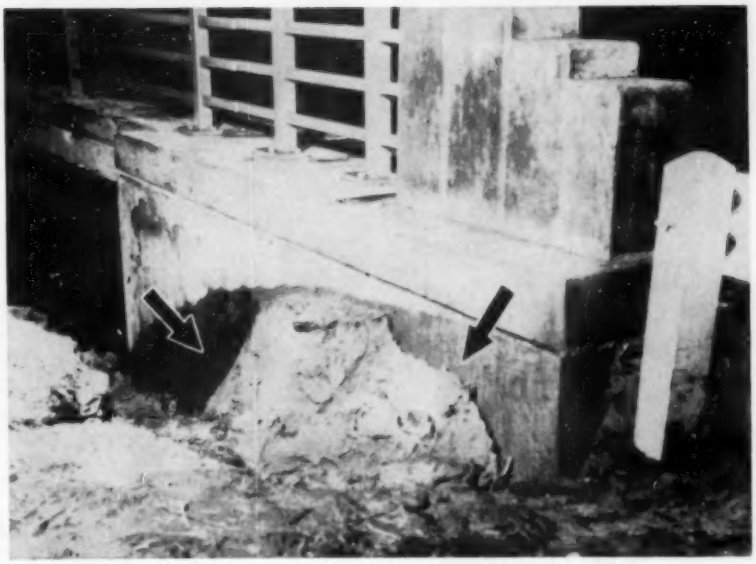
The preliminary testing of silicones on the Thruway involved about 1,000 sq. yd. of pavement. As described by General Electric Company engineers, SC-50 silicone solution for the preliminary panel test was applied at the rate of 50 running feet of lane per minute, using a pressure distributor. The General test program under the direction of Dr. Charles E. Reed and Royal V. Mackey has been in progress since September, 1952. In addition to the above panels, the program includes the Schenectady interchange bridge, numerous road pavements in the area, and shoulders and bridge structures in adjoining Saratoga county.

According to a news release quoting Mr. Mackey, sample concrete blocks tested with SC-50 water-soluble silicone resisted deterioration twice as long as untreated samples, when both were subjected to severe, accelerated freezing and thawing tests in the laboratory. The report however did not make it clear what type of cement and what mix were used, whether the mix involved the use of natural cement or other air entraining ingredients, and with what percent of air entrainment.

Mr. Mackey explains that while silicones prevent water from soaking into the concrete, it definitely does not make the surface any more slippery, even during or after rainfall, than untreated pavement.

The test-panel treatment was executed with the assistance of the New York state department of public works and the Thruway Authority. C. H. Lang, the authority's chief engineer, worked closely with the project, as did Ira Paul, laboratory director, and George L. Nickerson, chief engineer of the department of public works. Ray Williams, superintendent of highways of Saratoga County, was instrumental in arranging for the tests in his county.

● Another 3 million barrels per year of cement production capacity is assured by anonuncement of Marquette Cement Manufacturing Company of Chicago of a $60 million expansion program.



● Concrete bridge abutment surface, treated with SC-50. A heavy rain has washed away the fill, exposing untreated areas which are dark due to absorbed water, compared to light colored areas which were treated. This color contrast is not intended to be an index of durability.

Courage on highway taxes

(Editorial in New York TIMES, *July 21, 1955)*

Whatever the final outcome on the Federal highway building program, one must admire the dogged determination of the majority in the House Public Works Committee which insists that spending and taxing shall be voted at the same time. Once again, after a night's sleep and further reflection which probably included a forward look to the elections of November, 1956, the committee stood by its guns and approved the principle of pay-as-you-build. Some modifications were made in the highway-user taxes, it is true, but these were offset by a year's extension of the taxing period.

The choice of taxes to be applied and the rate of these taxes were made public only last week, and then somewhat revised. They deserve the further study of fiscal experts in House and Senate, although the time before adjournment is short. The Senate has had no opportunity to debate specific financing details, contenting itself with rejection of the Administrative program of long-term bonds. Nor has the Ways and Means Committee of the House considered the taxing provisions.

The voters back home can't expect to get modern highways without paying for them. What they ask is a fair distribution of the expense. They would rather pay the taxes than do without the roads. They can understand a yes vote on higher taxes for fiscal soundness, and respect it, but they would not easily excuse an adjournment that failed to produce an adequate highway program.

Navy engineers honored

H. G. Mason and J. A. Bishop of the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif., and P. E. Brown and L. A. Palmer of the Bureau of Yards and Docks, Dept. of the Navy, Washington, D. C., were given the C. A. Hogentogler Award during the 58th Annual Meeting of the American Society for Testing Materials, held at Atlantic City.

The Award was established in 1954 by Committee D-18 on Soils for Engineering Purposes, in honor of its first chairman, and is given in recognition of a paper of outstanding merit on soils for engineering purposes presented before the Society. The award was given for the paper, "Piles Subjected to Lateral Thrust." Mason and Bishop received the award for Part I covering "Measurement of Earth Pressure and Deflection Along the Embedded Portion of a 40-ft. Steel Pile;" and Brown and Palmer for Part II covering "Analysis of Pressure Deflection, Moment, and Shear by the Method of Difference Equations."

The Award was made at the Fifth Session of the ASTM Annual Meeting, entitled "Symposium on Judgment Factors in Soil Testing."

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Hoist Rating*	4 tons	18 tons	22 tons	25 tons	30 tons
Cylinder Diameter (I.D.)	3"	4.75-3.75 – 2.75"	5.75-4.75 – 3.75"	6.75-5.75 – 4.75"	7.75-6.75 – 5.75"
Cylinder Displacement	276 cu. in.	3,696 cu. in.	5,890 cu. in.	2,818 cu. in.	6,117 cu. in.
Oil Capacity	2¼ gallons	12 gallons	17.5 gallons	25 gallons	30 gallons
Dumping Angle	40°	50°	50°	50°	45°
Mounting Type	center	center or outrigger	center or outrigger	center	center

*Hoist capacity governed by body length and pivot.

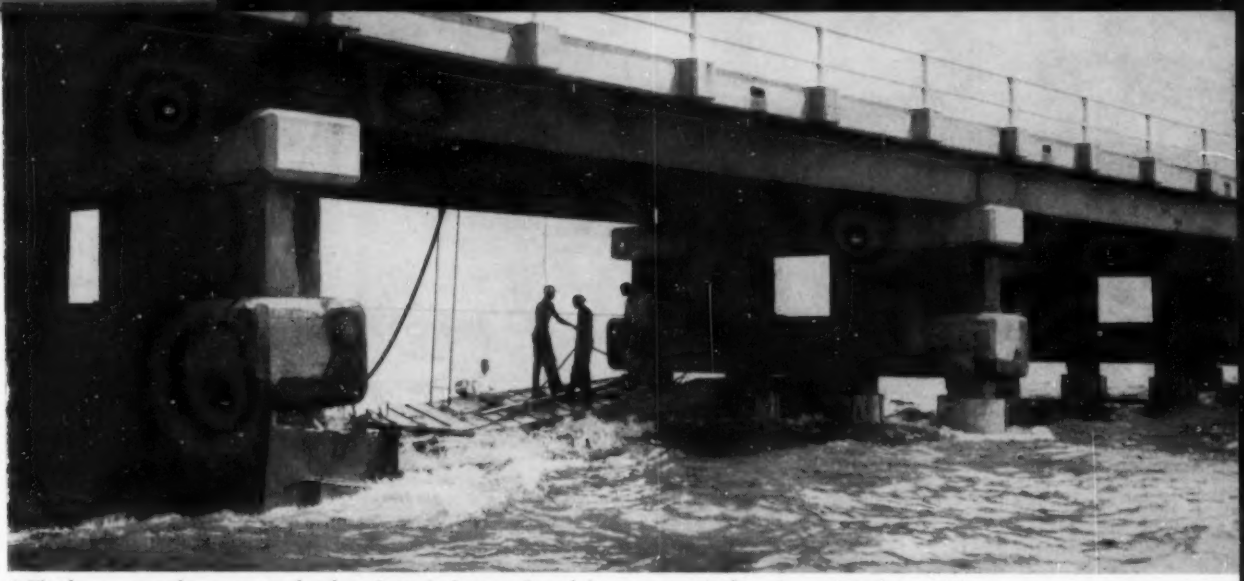
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. . . for more details circle 205, page 14



● Five-knot current has swept work raft on bent. Assistance of work boat was required to place raft back in position.

BIDDERS SUBMITTED OWN PLANS FOR

Difficult Bridge Repair Jobs

By Jack H. Gould, ***Associate Editor of Roads and Streets***

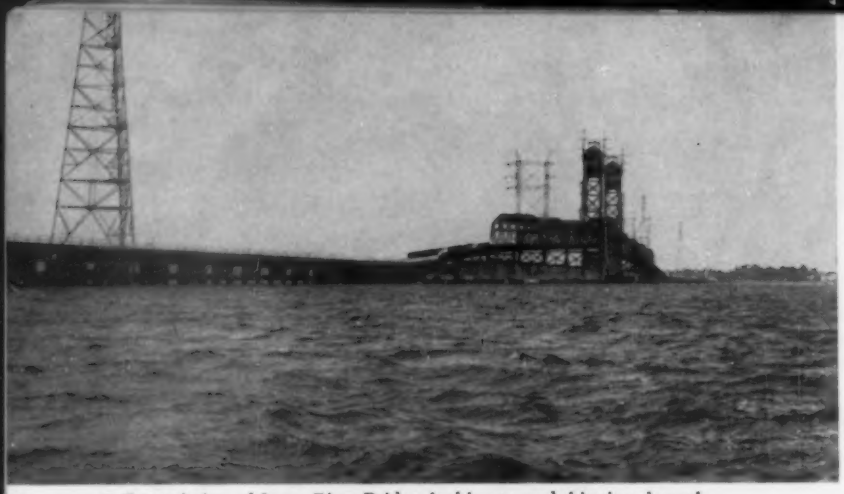
Bidders methods and reputation rather than price were basis for awarding $1,600,000 pile restoration job on James River Bridge System, largest project of its kind ever undertaken.

TIME and tide, not to mention salt water, have taken their toll on the 26-year old James River Bridge System, serving U. S. Route 17, between Newport News and Portsmouth, Virginia. Purchased in 1949 for $5,600,000 from private owners by the Virginia Department of Highways, the Bridge had received little maintenance. Subsequently the department has made some temporary repairs. Following approval of a revenue bond issue by the legislature in 1952, for this and other bridges in the Tidewater area, Parsons, Brinckerhoff, Hall and MacDonald, consulting engineers of New York, were engaged in 1953 to prepare plans for complete rehabilitation.

Considerable work done to date includes grid flooring on movable spans. $136,000 (contractor, Whiting-Turner Co., Baltimore, Md.); and improvements to electrical operating equipment at $46,870 (Virginia-Carolina Electric Co., Norfolk, Va.); con-



● Concrete being placed by hand in pile jackets and rodded. In background, Gardner-Denver 600 cfm compressor.



● General view of James River Bridge, looking toward shipping channel.

tract by the utility to Richardson-Wayland Electrical Corp., Roanoke, Va., for a modern lighting system.

In July of 1955, a contract for painting and cleaning the steel superstructure was awarded to Paint Products Co., Newport News, Va., at $94,-271. Still in the design stages are plans for new toll plazas at both ends.

Major Project

The largest and toughest part of the job is still in progress with a late 1955 completion date. In June of 1954, a cost-plus-fee contract was awarded to Masonry Resurfacing and Construction Co., of Baltimore, Md., and Warwick, Va.

This contract provides for repairs to all damaged and defective concrete below deck throughout. The contract covers such work as is indicated on the plans, discovered by inspection in the field, or "as directed by the engineer." Purpose of the repairs is to restore to structurally sound condition all concrete work that has deteriorated to the extent that parts of the structure are inadequate for the normal loads, and to forestall further deterioration of parts showing only minor defects, though still structurally sound.

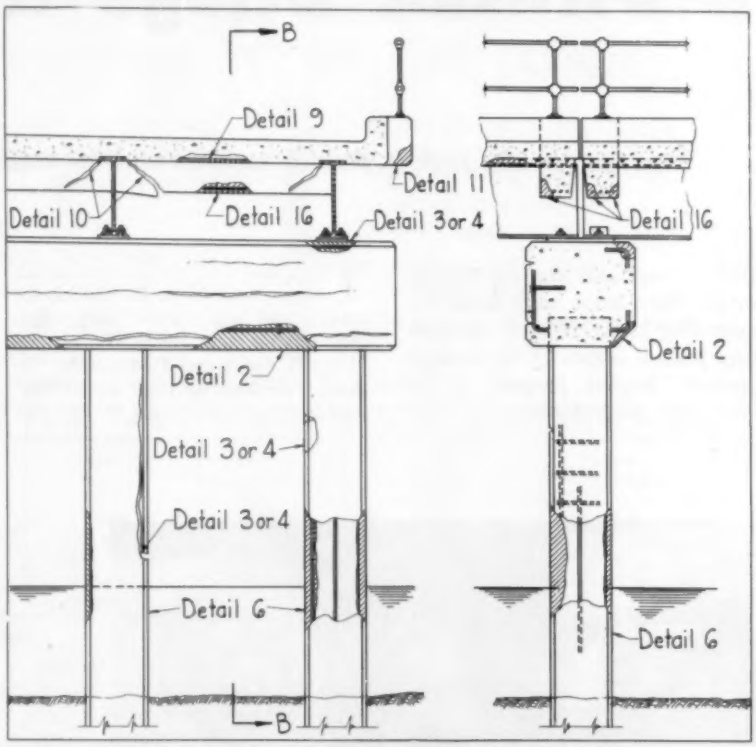
The James River Bridge System, 12.08 miles in length, includes the James River bridge, 4.39 miles long; the Chuckatuck Creek bridge, .48 miles; and the Nansemond River bridge, .71 miles, with 5-mile and 1.5 mile intervals. The James River bridge has a 300 ft. movable span; two smaller bridges, 110 ft. spans each. With the exception of the movable spans and an 810 ft. steel girder section in the James River bridge, the system consists of a two-lane concrete roadway on steel stringers, supported by precast concrete pile bents. The system contains 582 bents and 32 piers. Exclusive of the pier piling there are 2,692 piles in the system, either 18 or 24 in. square. Minimum tidal action is 2.6 ft.; maximum is 4 ft.

Bids Based on Methods

One of the many unusual features of this project was the procedure followed in taking bids. The job is purportedly the largest of its kind ever undertaken. This factor, coupled with the uncertainty of tides, sudden weather changes, fast moving currents in the James River, the indeterminate amount of materials required, and the excessive cost of making a detailed inspection of the underdecking and piling, caused the Virginia Department of Highways to ask for bids on a unique basis.

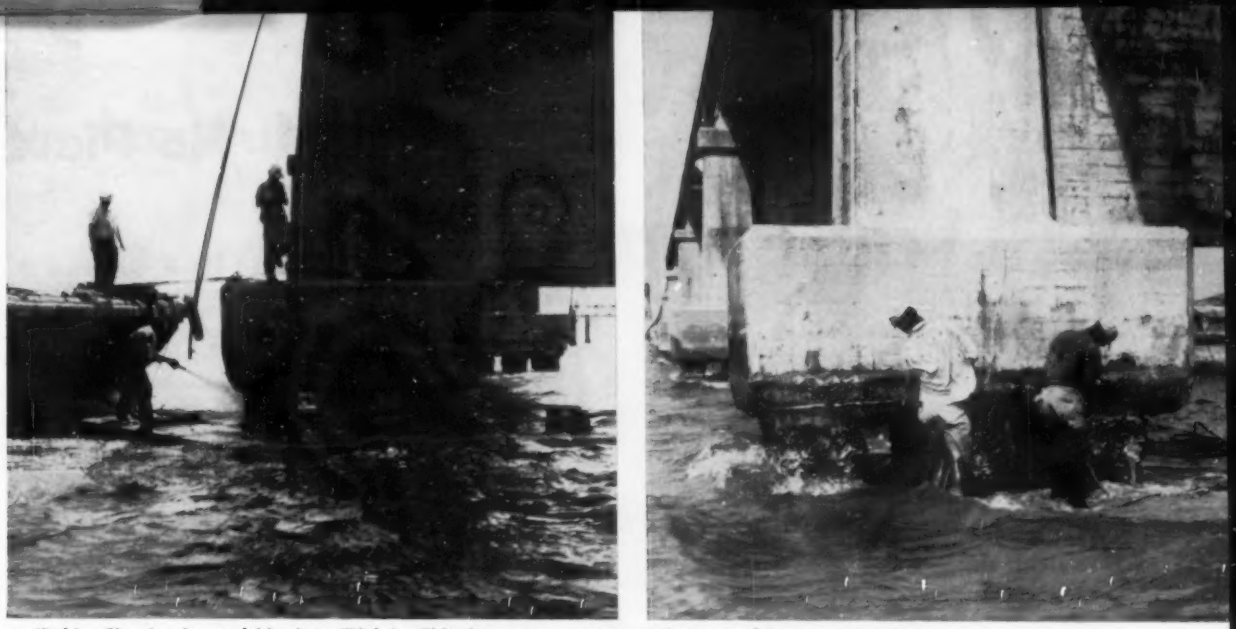
The department and its engineers recognized that there were several acceptable methods of doing the work, some involving patented procedures. They also felt that prior successful experience in this or similar type work was a major factor.

Drawings indicating the nature of the repairs to be made, typical conditions existing at various bents, and suggested and accepted methods of making repairs, were prepared by the consulting engineers. In addition to the use of Virginia road and bridge specifications, where applicable, broad special provisions were drawn up to cover the unusual conditions to be encountered. To encourage competitive bidding from as many qualified contractors as possible, the special provisions were made as general in their scope as good engineering practice permitted. Various methods of placing mortar and concrete were listed as being acceptable; however the bidder was not limited to these methods, provided the method he proposed seemed adequate. Definite specifica-



● Figure 1. Elevation of typical pile bent. At right, section B-B. Not all of these conditions exist on all bents, but are typical of various conditions of cracking, spalling, and erosion found the length of the bridge system.

Roads and Streets Staff Report



● (Left): Cleaning by sand blasting. (Right): Chipping crews use pneumatic powered hammers. Work at these points could be done only at low tide.

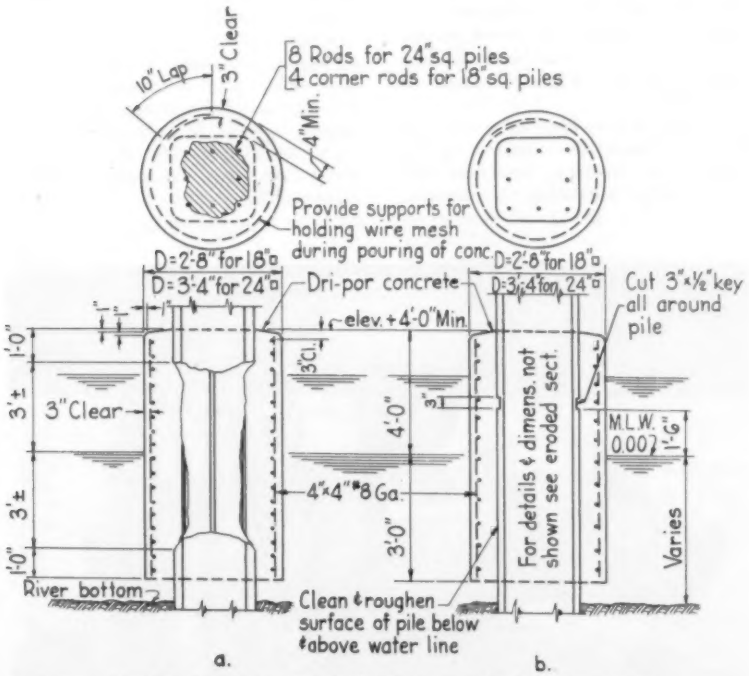
tions were set forth on steel work, welding and paints, as well as the use of air entraining admixtures and a retarding-densifier. The special provisions also suggested that the bidder might be guided in preparing his proposal by consulting Chapter VII, "Repair and Maintenance of Concrete," pages 327 to 345, of "Concrete Manual, United States Department of the Interior, Bureau of Reclamation, September, 1949," for the repair of old concrete work.

Each bidder was required to submit with his proposal working drawings and specifications. These along with the standard specifications became part of the contract document. Some of the requirements set forth in the special provisions are:

Preparation of Proposal: "The contract plans and specifications delineate in general the work to be performed and describe the minimum requirements for materials and workmanship. Accordingly the bidder shall submit with his proposal, working drawings and specifications of the plant and equipment, materials, and methods he proposes to use in accomplishing the work. Such working drawings and specifications shall be in sufficient detail to permit the commission to determine that the requirements of the contract plans and specifications will be fulfilled. The contractor shall state in detail the methods and materials he intends to use in making each proposed type of repair to the concrete work of the bridge system; including the methods of cleaning; preparation of the surfaces; mixing and placing of concrete and or mortar; and admixtures.***"

"Any and all proposals will be rejected if not accompanied by working drawings and specifications.***"

Consideration of Bids: "In determining the successful bidder, the Commission will be guided both by a comparison of the prices bid and an evaluation of the plans and specifications outlining in detail the bidder's proposed methods for performing the work.***"

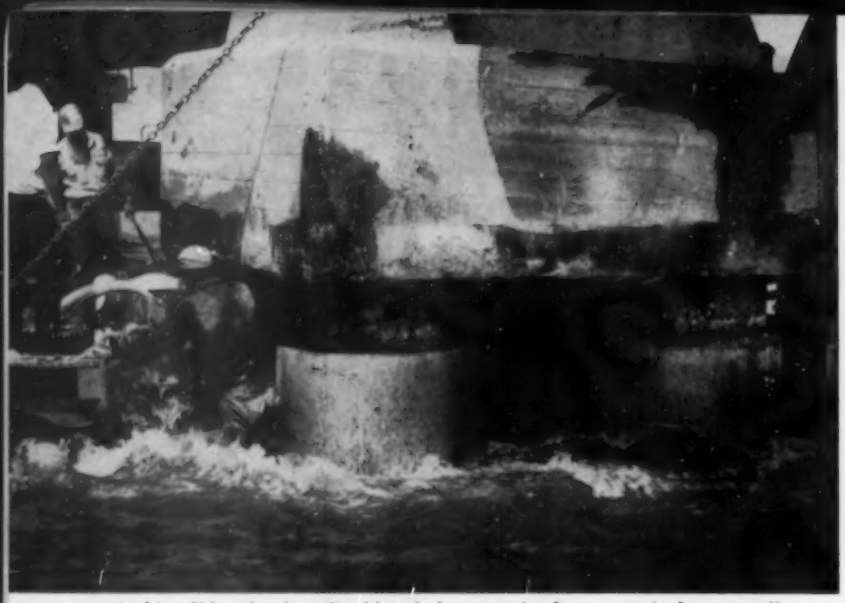


● Figure 2. Method of repairing piles by jacketing. "a," method of repairing eroded piles. "b," method of repairing intact piles.

Four Lump Sum Bids

Lump sum bids were asked on four items. Item 4, profit fee, provided three alternates, depending on the final cost of the work.

Item 1. Lump sum bid for mobilization of equipment, tools and field offices (not including moves on the job). Payment here provides for full compensation for all direct and indirect labor, materials, overhead and supervisory costs and profit chargeable to the mobilization and demobilization of equipment and tools, including requirements for transporting from factory or storage yard, to the site of



● Locking K-box in place. Double pile bents are hardest to repair due to small space between piles. Concrete jacketing of piles in foreground has been completed. Area between top of jacket and cap will be repaired by gunite method.

No Place

the work, and of erecting temporary buildings; premiums and fees paid for taxes, royalties, etc.; interest on investments; depreciation, obsolescence, damages, and loss; profit; and, at the completion and acceptance of the work, the demobilization of all plant and equipment.

Item 2. Lump sum bid per month for rental of equipment and tools (including repairs). Payment covers full rental compensation for all direct and indirect labor, materials, overhead and supervisory costs, and profit chargeable to rental of equipment and tools, including their maintenance and repair; for both contractor-owned and rented equipment and tools.

Item 3. Lump sum bid for service fee for the work defined under this item in the special provision attached to proposal form. Payment covers all full compensation for the professional services of the contractor, his executive officers and members of his firm; the services of the contractor's main office employees, except when executing drawings, design or re-estimation of plans required by the contract; the expense of branch offices not maintained exclusively for this contract; all general expenses of maintaining the contractors organization and doing business not directly occasioned by this contract.

Item 4A. Lump sum bid for profit fee based on the cost of the work excluding Items 1, 2, and 3 amounting to $500,000, "which lump sum profit fee shall be increased or decreased respectively in direct proportion as the said cost of the work shall increase by $250,000 or any part thereof, or a decrease without limitation."

Item 4B. Lump sum bid for profit fee, based on cost of work excluding Items 1, 2, and 3, amounting to $1,000,000; to be increased or decreased in direct proportion as cost of the work is increased, or decreased by $250,000.

Item 4C. Lump sum bid for profit fee based on the cost of work excluding Items 1, 2, and 3 amounting to $1,500,000; to be increased or decreased respectively in direct proportion as said cost of the work shall increase without limit, or decrease by $250,000.

A total of nine bids were received. Each bid was accompanied by the contractor's working drawings and specifications indicating the methods he proposed to use. Submitted also was a complete list of the equipment the contractor proposed to use, including floating plants.

Upon receipt of the bid, the engineers and the highway department each made an independent analysis of the proposals, giving particular attention to the methods outlined, and the amount of plant and equipment proposed to be utilized.

The two highest bids were eliminated when it was determined that several of the other bidders were qualified to do the work. The low bid was eliminated when a review of the contractor's drawings and specifications indicated that this company was not familiar with the nature of the work to be undertaken. This proposal indicated an equipment schedule which would have fallen short of meeting the required time schedule. Since additional equipment and manpower required a proportionate increase in the lump sum bid on Item 2, the final cost would have been considerably greater.

Tabulated on the opposite page is a comparison of the high, low and awarded bids. For purposes of uniform comparison, Item 2 (monthly equipment rental) has been computed on the basis of the original 9-month estimate, and the maximum profit fee has been used.

Upon completion of their independent analyses of the proposals, both the highway department and the engineers agreed that Masonry Resurfacing and Construction Co., of Baltimore, Md., was the lowest qualified bidder. The award was based upon



● K-box locked in place around pile, here shown being dewatered.

for Landlubbers on This Project

the detailed plans and specifications submitted by the company and the excellent recommendations of former clients, particularly the B&O Railroad and the Maryland Highway Department.

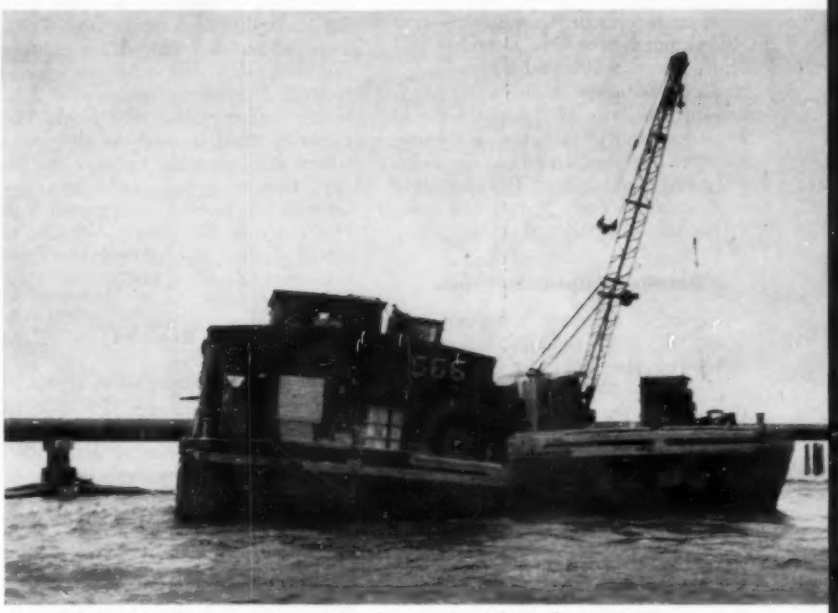
Work commenced on this project in June, 1954. Although Masonry Resurfacing and Construction Co. has had 27 years experience in this type of work, S. S. Glassgold, company vice-president, advises that they have never encountered a job having this magnitude or multiplicity of problems.

All Supplies by Water

The department prohibited the delivery of materials or supplies over the bridge, making it necessary to supply all work barges and crews by water. An old covered barge was purchased and beached at the Newport News end, for use as a warehouse. The land end of the barge is served by U. S. Route 17, while the opposite end, and one side, are in water of sufficient depth to permit loading of work boats. At the same time it was necessary to assemble a small "navy," consisting largely of equipment purchased new for this job.

Among the equipment on the job at mid-Summer were: 3 2-ton dump trucks; 1 personnel carrier; 1 Lima ¾-ton clamshell crane; 1 Lorain ⅜-yd. clamshell crane; 2 Gardner-Denver 600 cfm diesel compressors; 1 Chicago Pneumatic 600 cfm rotary compressor; 3 Gardner-Denver 365 cfm compressors; 1 Jaeger 2-bag mixer; 2 Jaeger 1-bag mixers; 10 Lincoln arc welding machines, trailer-mounted; 1 generating plant for lights; 20 Chicago Pneumatic or Ingersoll-Rand air powered sump pumps; 2 Gardner-Denver reciprocating pumps; 3 cement guns; 28 chipping hammers; 8,000 lin. ft. of hose of all sizes.

Marine equipment includes 7 barges, 30 x 80 ft. and 30 x 100 ft.; 1 small twin barge; 1 26-ft. launch; 1 LCM; 2 shallow draft work boats powered by 130-hp marine gas engines; 4 26-ft. work boats powered with 4-cylinder gas engines; 1 gas powered boat, personnel carrier; 9 skiffs equipped with outboard motors; and numerous rafts used by the work crews. These rafts are fabricated at the job site and require frequent replacement because the salt water rapidly rusts out the buoyancy tanks.



● At left is one of the concrete mixing barges. Lorain ½-yd. clamshell crane on the open barge is used for handling aggregates and lowering K-boxes into water.

It was originally intended that only those piles and caps that were badly eroded would be repaired. The bent numbers and piles to be repaired were indicated by the engineers, but as work progressed it was found that repairing isolated piles was costly and that additional piles and caps required repairs. Considerable cost is involved in moving the gunite and pile repair crews from one location to another, and from time to time it becomes necessary to move the concrete mixing barges. Based on this experience the engineers recommended that all bents and damaged concrete be repaired, resulting in considerable saving in unit cost.

A Difficult River

L. A. Swindell, project superintendent, says the only major problem on this job can be summed up in three words: "the James River." Piles are variable in length and caps are at different elevations above the water line; certain bents can be worked on only at low tide; other bents only at high tide. This requires moving the chipping and cleaning, gunite and pile repair crews in some locations, with each change of tide. When the tide is running out, currents of five knots or more are not unusual. Winds frequently come up without warning, kicking up waves and sending small craft and men to cover. Twice since the job started it has been necessary to move all equipment including heavy barges to dockage in Newport News or Hampton, upon receipt of hurricane warnings. During Hurricane Carol in 1954, and Connie this past summer, the equipment was tied up at Newport News. For no particular reason in 1954 the equipment was moved to Hampton, upon receipt of the Hazel warning. Had it been moved to its Carol location a great deal of it would have been lost or seriously damaged.

On the job site, sand and gravel are delivered direct to the mixing barges, by work boat; however, a tug brings the sand and gravel barge from the supply source in Hampton. The LCM is equipped with a built-in water tank and pump. Over 1,000 gal. of fresh water is hauled daily to the concrete

Comparison of Bids Made on Methods Basis

Bidder	Item 1	Item 2	Item 3	Item 4C	Total
Low	$ 34,000	$ 91,800	$ 25,000	$ 45,000	$195,800
High	367,000	279,000	50,000	70,000	766,000
Award	32,500	130,500	20,000	60,000	243,000

and gunite barges. It is also necessary to haul and pump all fuel for the power equipment on the various barges.

Work continued throughout the 1954-55 winter, except that operations on the James River Bridge were discontinued between December and April, due to winds and waves.

The contractor made a thorough advance analysis of the problems as evidenced by the fact that only minor changes have been made in the original plans as submitted. These changes were improvements in methods gained by actual experience on the job.

Detailed Repair Methods

Figure 1 indicates a typical pile bent and various types of damage encountered the length of the bridge system. Prior to placing any concrete or masonry, the damaged area is thoroughly cleaned by chipping, scraping of eroded material, and/or sand blasting. Where concrete is badly cracked, the old concrete is cut away deep enough to expose all sides of the reinforcement. Where the surface of the reinforcement is only slightly rusted it is cleaned, but where badly rusted, it is called to the attention of the engineer. The engineer may direct that the reinforcement be cleaned; that it be removed and new reinforcement butt-welded in its place; or that it be cleaned, left in place and a new rod spliced in. New rods are lapped 6 in. over sound rod remaining in place.

All prominent cracks in concrete are cut out deep and wide enough to make a sound and permanent patch entirely surrounding the reinforcement and for at least one inch at its backside. If the steel appears rusted, indicated by a stain on the concrete, the procedure outlined above is followed. Where no deterioration of steel is indicated, the minor cracks are cleaned, primed with Bituplastic Primer, and painted with two coats of Koppers Co. Bituplastic No. 28.

The gunite mix consists of 1 part of high early strength cement to 3 parts of fine aggregate. All repairs to the spalled concrete bottom of the deck lab are made with gunite. After cleaning, 2″ x 2″ 10-gage galvanized wire mesh is anchored in place with 3/8-in. galvanized expansion bolts. This method is followed not only on the deck slab, but wherever gunite is used. A minimum coverage of 2 in. is required over the wire mesh. The gunite method is used on all repairs where it is possible to work in the dry. As soon as the gunite areas are set they are primed and painted with two coats of Bituplastic No. 28, to retard drying and protect the fresh masonry from salt spray.

Pile Repairs

The method used in the repair of piles is determined by the state of deterioration of the concrete and the length of pile above mean low water. Figure 2 indicates methods used.

Damage to piles at water line and under water are repaired by jacketing with concrete. The length jacketed extends 1 ft. past the sound concrete or 4 ft. above mean low water. If the damaged area above the 4 ft. point exceeds 2 or 3 ft. and is not badly eroded, the damage is repaired by the gunite method. At bents where the pile cap is close to the waterline it is considered more economical to jacket the pile to the bottom of the cap.

This work is performed in the dry, by the use of portable cassons designated by the contractor as K-boxes. The K-box, patented by the contractor, and specially designed for this job, consist of two triangular half-sections of a square, either 5 ft. or 5⅓ ft. on the outside, and ranging in depth from 4 to 10 ft., depending on the length of the pile repair. The bottom of the box is fitted with an opening equivalent to the area of the original piles. This opening is lined with a gasket which provides a water-tight seal when locked in position around a pile. The two half-sections of the K-box are placed in position around the pile and the opposite corners locked together automatically. The box is dewatered with a sump pump, the outside water-pressure sealing the gasket against the pile. The size of the box is determined by the diameter of the pile, since sufficient space must be provided to permit men to work inside.

Novel "K" Box Devised for Jacketing

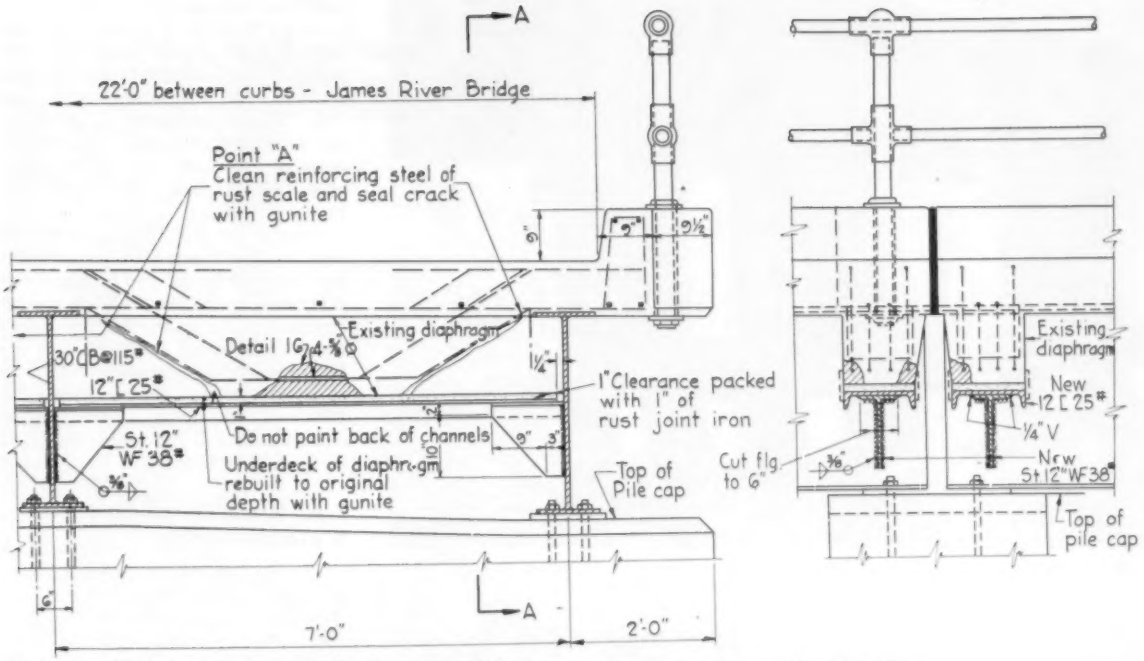
A metal platform is set around the pile 6 in. above the bottom of the K-box. After the damaged area has been cleaned and reinforcement replaced where necessary, 4″x4″ 8-gage galvanized mesh is fastened in place. The form used for placing concrete consists of two half-circular sections of 12-gage galvanized steel with lip flanges. Diameter of the forms for 18-in. piles is 32 in.; for 24-in. piles, 40 in. Form diameter is determined by the requirement that the jacket be not less than 4 in. from the corner of the original pile. Length of the form varies according to the size of the damaged area.

The form is fitted around each side of the pile on a special bracket so that the jacket does not rest on the K-box floor since movement of the box would disturb the recently poured pile. The two half-sections are fitted together by means of ¾″x6″ galvanized expansion bolts. Using the contractor's "Dri-Por" system, concrete is mixed on the barges, loaded in buckets and delivered by work boats to the site where it is placed in the form by hand and rodded.

Specifications require that the concrete contain an air entraining admixture introduced on the job. Also required is a retarding-densifier. The exact formula of the concrete was not disclosed. Type II portland cement is used; aggregate is washed concrete sand and ¾-in. gravel. A 6½-bag, 5-



● Jacketing of piles on left is completed. Two K-boxes on right are being dewatered.



● Figure 3. Typical roadway section showing new end diaphragm supports. At right, section A-A. This method used only where existing diaphragm is cracked at point "A."

gal., 1:2.2:2.8 mix is used. The mix contains an undisclosed percentage of fly ash. Cylinders have averaged 2,600 psi at seven days and 4,500 psi at 30 days.

As soon as the concrete is placed, the K-box is allowed to fill slowly with water. In approximately 20 min. when the box is filled it is removed from the pile. The platform on which the form was placed prevents salt water from coming in contact with the freshly placed mix. Original plans provided for leaving the K-boxes in place until the concrete had set. Experience indicated that the platform effectively protected the fresh concrete, and the engineers permitted the change in plans. This procedure greatly reduced the number of K-boxes required on the job and permitted moving the box to the next pile almost immediately.

The galvanized metal forms are left in place, not only to protect the new concrete jacket, but because this method is cheaper than stripping the forms.

Many Diaphragms Repaired

Many of the concrete diaphragms have been found to be cracked or otherwise requiring repair. Figure 3 indicates the condition usually encountered and the method of repair to badly cracked diaphragms. Upon inspection by the engineer, one of two methods of repair has been directed. In each case the existing concrete is repaired by guniting. A 12 in. WF 38 lb. structural tee is welded to the existing 30-in. I-beams. To these tees a 12-in. 25-lb. steel channel is welded. The 1-in. space between the concrete diaphragm and the channel, along its whole length, is packed with a mixture of Master Builder's Rust Joint iron, and water. This mixture expands as it hardens, providing direct bearing of the channel on the concrete diaphragm.

Original plans called for welding the tee to the I-beam 1 in. lower and filling the 2-in. space between the channel and diaphragm with a mixture of 1 part cement, 1 part sand, 1½ parts ¾-in. pea gravel, 1 part Embecco, and 5 gal. of water per bag of cement. The contractor found however that this mixture failed to expand except at the edges where it was exposed to air. The new method was adopted and found to be satisfactory in all respects.

All welded and new steel surfaces are cleaned by wire brushing, sandblasting or flame, after which they receive one prime coat of Bituplastic Primer and two field coats of Bituplastic No. 28. Paint surfaces damaged during construction receive the same treatment.

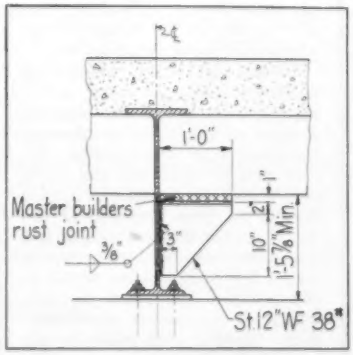
Where the concrete diaphragms are intact, the tee is welded to the existing carengie beam and the space between the plate and the existing diaphragm filled with the nonshrinking mixtures, as illustrated in Figure 4.

Progress on the James River Bridge this summer averaged 50 piles and 37 diaphragms per week. Progress was expected to pick up in late summer when work was completed on the more complicated bents subject to severe tidal conditions.

Acknowledgements

In spite of the hazardous nature of this work and the fact that between 150 and 160 men are employed on the job, only one lost-time accident has occurred to date.

The project here described is under W. R. Glidden, assistant chief engineer; J. N. Clary, bridge engineer, and D. B. Fugate, district engineer of the Virginia Department of Highways. G. H. Wilson, is resident engineer for



● Figure 4. Method of providing new diaphragm supports for intact diaphragms.



● Completely repaired bent at low tide. Piles repaired by jacketing and gunite. Black areas on sub-caps are completed gunite repairs.

Parsons, Brinckerhoff, Hall & MacDonald, which firm prepared the original plans and specifications and are supervising the work. I. Leon Glassgold, chief engineer of Masonry Resurfacing and Construction Co., is responsible for planning and operations. B. R. Belote, superintendent, James River Bridge System, has aided the contractors in coordinating the work with system schedules.

Unsolicited Testimonial

During the course of repairs to the James River Bridge a Cement Gun Operator was working on a patch near the base of the railing. The flagman assigned to this location failed to advise him that a car was approaching or to halt the car. Just as a brand new 1955 shiny red Buick went by, the operator opened the gun spraying the car from bumper to bumper. Unable to stop on the bridge or turn around the driver continued on.

Several days later, returning across the bridge the owner, a contractor from northern Virginia, stopped at the office of Masonry Resurfacing & Construction Co. and advised them that the Buick people had been unable to remove the mortar from the side of the car, that since the car was new and the paint not "set" they would wait a few weeks before trying to rub it down. Remarked the contractor to the project superintendent: "If that stuff sticks to the bridge like it did to my car, this thing will be here forever."

$500 Million civil airport program assured

President Eisenhower has signed into law S. 1855, an act which establishes a program level of about $63 million in Federal funds for each of the four years 1956 to 1959. Matched by the states, this will provide an airport construction program of approximately $500 million.

The Civil Aeronautics Administration will soon announce the allocation of the $20 million for fiscal 1956 which was appropriated by Congress prior to the enactment of the new law. The new law makes available an additional $42.5 million for this current fiscal year. The programming of this additional amount will be deferred for about 90 days to permit sponsors to develop longer range plans, and to submit new or amended applications based upon the level of funds now available.

This interval will also permit the CAA to develop revised administrative standards. A thorough review of present programming and priority standards is being undertaken in order to determine the most equitable basis for administering this program for the balance of the present fiscal year and for future years.

Fred B. Lee, CAA Administrator, has invited representatives of interested groups to act as an Advisory Review Committee to consult with CAA officials. The American Road Builders' Association will be represented on this committee by B. F. Ostergren, Managing Director, Municipal and Airport Division.

Previous to the enactment of the new law, Federal-aid to airport appropriations have been made on a year-to-year basis. These have fallen far short of the authorizations. The new law will make advanced planning possible. The Department of Commerce has estimated that local units of government have over $160 million available for matching the Federal-aid funds.

Contrary to the decision made last year by the Commerce Department, smaller airports will also be given consideration as the act prohibits any restriction on aid on the basis of airport size. Of the funds available, 75% will be apportioned to the states on a basis of population-area formula. The other 25% will constitute a discretionary fund which will be administered directly by the Commerce Department.

F.A. funds available 5 months early

The apportionment of $875 million in Federal-aid to the states for highways has been made for the fiscal year 1957. The apportionment, covering the second and final year under the 1954 Federal Aid Highway Act, comes five months before the time limit set by Congress.

Under this apportionment, the primary systems receive $315 million; the secondary systems, $210 million; urban extensions, $175 million and the Interstate System, $175 million. These funds are now available for commitment to projects by the individual states.

The apportionment for fiscal year 1956 resulted in a 20% acceleration in the Federal aid program in that year. An even greater increase is expected in the current year.

New soil-cement film

A 21-minute sound and color motion picture entitled "Soil-Cement for Low-Cost Paving," recently released by the Portland Cement Association, shows examples of soil-cement roads, streets, airports and parking areas in all parts of the United States.

Other action includes an explanation of what soil-cement is, its properties, its engineering characteristics, its application to various types of paving situations, and a brief section on construction. Examples illustrate the material's proven record of durability and low cost.

The 16 mm. film is available for showings without cost for engineering group meetings, college courses in highway engineering, and service clubs. Availability is subject to previous bookings, from the Portland Cement Association, 33 West Grand Avenue, Chicago 10, Illinois.

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Because Peladow stores so well in bulk form, it is ideal for use in highway ice control programs. If you prefer direct application of ice-melting chemicals, these fast-acting pellets can be stored now, ready for use when that first early winter blizzard arrives. Applied with a mechanical spreader, Peladow melts ice like magic—even in subzero temperatures! Highways are made safe for driving faster.

If you prefer to use Peladow-treated abrasives, the bulk pellets will be available for use by your crews during the coming months as stockpiles of coarse sand or cinders are prepared. In addition to the saving in package costs, you benefit by the economy of mechanical handling of bulk Peladow in comparison with bagged calcium chloride.

Peladow is shipped from Dow's Ludington, Michigan, plant in specially designed hopper cars with weather-tight hatches and gates. Peladow is also available in bulk in tank cars and trucks, as well as in 100-lb. bags. Contact Dow for complete product, application, handling, storing or shipping information.

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Making second pass over slab on Garden State Parkway in New Jersey, this Flex-Plane Self-Widener "paid for itself in no time at variable width sections."

Note near perfect slab behind Flex-Plane that will require little more than a token pass by a straight edge.

Here's positive proof — the new Flex-Plane Self-Widening Finisher is everything we said it would be. It's the most versatile finishing machine ever built!

With a flick of the finger the operator can reduce or extend the width of the machine to exactly suit job requirements—an invaluable asset when paving crossroads, aprons, interchanges, passing strips, etc. And, it's accomplished through an entirely new design principal—**the frame widens—not the wheels**, which means the machine sacrifices no strength or rigidity even at its widest setting.

Add to this the unparalleled portability of the

WORLD'S LARGEST BUILDER OF CONCRETE FINISHING

SELF-WIDENING FINISHER...
on two major turnpikes!





"Greatest finisher I've ever seen," said concrete foreman of the new Flex-Plane Self-Widener, as it worked the maze of variable widths on an Ohio turnpike interchange.

Flex-Plane, the greater power and speed, the improved screed action that all but eliminates handwork, and you have the big reasons why it's the fastest selling machine of its kind. You have only to see it in action—to talk with owners and operators to convince yourself that this new Flex-Plane will outperform any other finisher on the forms today.

Before you buy finishing equipment let us put you in contact with a Flex-Plane owner—and we're certain you'll join the ever increasing list of leading contractors who specify finishing equipment by Flex-Plane.

General view of interchange where Flex-Plane's self-widening feature saved "hundreds of man hours."



THE FLEXIBLE ROAD JOINT MACHINE COMPANY

5700 Thomas Road

WARREN, OHIO

EQUIPMENT

. . . for more details circle 201, page 14



● Heavy snow in Clinton County's plateau area requires heavy blower operation. (Photo, winter of 1954-55.)

HOW CLINTON COUNTY CHARTS ITS

Snow Plowing Equipment-Hours

By John H. Coffey
Superintendent of Highways, Clinton County,
Plattsburg, New York

Work records help visualize winter patterns and aid in planning snow removal; the county's plowing methods here reviewed.

CLINTON County, in northeastern New York State, lies in the Adirondack foothills. Roughly 30 by 40 miles in size, its eastern part is level, the terrain rising gradually from Lake Champlain at elevation 95 ft. The southwestern part is mountainous and heavily wooded. The northwestern part is a plateau with an average elevation of 1500 ft. It is here in the plateau that our winter storms are the most troublesome.

Our county is not in the so-called "snow belt" of New York State, but occasional storms sweep the plateau area to such severity that for two or three days at a time no snow removal equipment can work safely. Although equipment operators are directed to start with the storm and to stay out as long as it is reasonably safe, they must, in severe storms, pull off the highways.

There are three road systems in the county. The town road system has 910 miles; the county road system has 341 miles; and the state road system has 225 miles. The towns take care of their own system, summer and winter; the county contracts with the various towns for snow removal and necessary sanding.

The county has the responsibility of removing the snow from the state system of highways and for sanding about one-half of the state mileage. For doing this, the county is reimbursed by the state for 100% of the costs. It is the winter maintenance of the state system of highways that I will concern myself with in this article.

How County Organized

The County Highway Department garage and storehouse are centrally located, and it is here that all the orders on snow removal go out and where the repairs are made. During the winter the garage remains open on a 24-hour basis with the garage superintendent on duty from 7 a.m. until 5 p.m. During the other hours, he assigns construction superintendents who are free, to direct the snow removal personnel. The county does not have a two-way radio system and must depend upon the telephone to reach its operators.

The snow removal equipment consists of 3 medium size rotary blowers, 13 trucks, and 3 heavy-duty graders. The rotary blowers are all of the same make, so that a minimum of repair parts need be stocked. Of the trucks, five are 4-wheel-drive, heavy-duty with a piston displacement of from

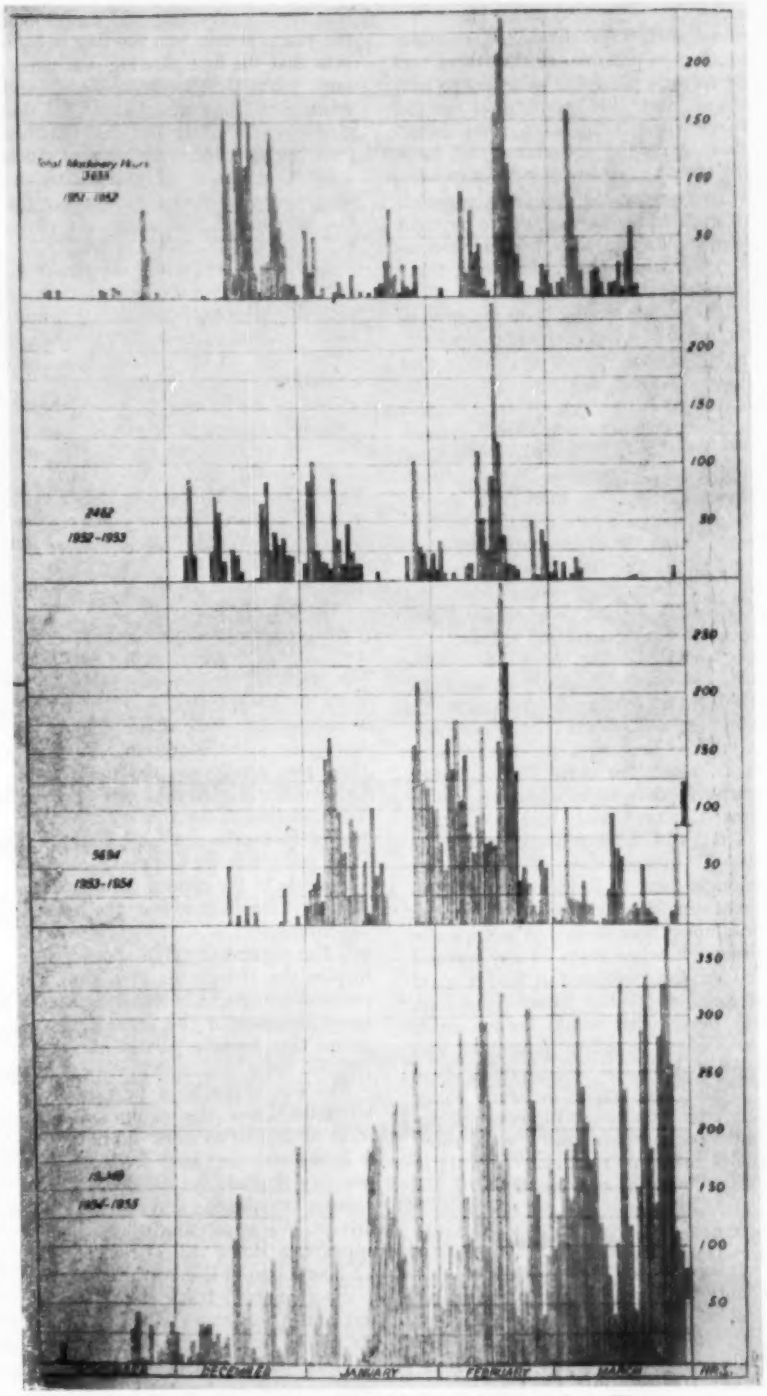
450 to 650 cu. in. The other 8 trucks are medium-sized, with piston displacement from 268 to 450 cu. in. All trucks are equipped with straight or V-type plows. The power graders are equipped with plows and wings. In addition, there are available to the county four rotary blowers owned by towns in the northwestern area.

In early October, the trucks to be used on snow removal begin coming into the county garage for cleaning, reconditioning, and for mounting hydraulic equipment for plows and wings. As the trucks are made ready for plowing, they are put in storage in the central garage, or at one of the four other garages in the county. Each garage is heated, has a telephone, and is large enough to hold at least two trucks.

We do not find it wise to operate a truck any greater distance than 20-mile radius from its place of storage — for the reason that for snow removal to be effective and satisfactory, trucks must cover the roads very soon after snowfall has started. This you cannot do if the distance is great.

Our snow removal force has been instructed to go to their equipment when a storm is at hand. A check is made on this by the garage superintendent, who places a telephone call to any operator who has not reported; also to the foreman directing equipment stored in outlying districts. When two inches of snow has fallen, trucks are sent out equipped with straight blade plows. These straight blade plows are preferred over the V-type plows because: (1) They take a wider swath, and (2) they remove the snow far from the pavement — over the shoulder of the road — into the ditch and beyond. The sooner and the more often these plows can cover the pavement after a storm starts, the better, because traffic will have less chance to compact the snow.

And, since most "icy pavements" are the result of compacted snow, there is a further saving in ice control. Where traffic is heavy as on US 9, main highway connecting New York City with Montreal, chemicals are applied with a mechanical spreader after an inch of snow has fallen. With moderate temperatures salt is used; in low temperatures, calcium chloride. The chemicals form a brine on the pavement and make for less adherence of snow.



● Daily record of equipment-hours worked in removing snow from Clinton County's state road mileage, as charted by Mr. Coffey. (Chart photographed while tacked on office wall.)

As the Snow Deepens

When the conditions become too rugged for the straight blade plows, the heavier trucks are brought into the garage, one by one, to be fitted with the V-type plows. Graders are also brought into action at this time, first for plowing; then for "winging back," for which they are especially fitted; and finally when the storm has subsided, for removing ice and compacted snow from the pavement. The heavy grader is a very useful all-around piece of snow removal equipment.

The rotary blowers are put to work as soon as there is any appreciable accumulation of snow on the shoulder of the road — let us say, 18 in. or

more. It is the county's plan to remove such snow from the shoulder as soon as possible, so that there will be room to place the snow in the next storm. Also, this insures that the old snow will not act as a snow fence, slowing up the snowflakes and causing them to fall on the pavement.

It is preferable and less dangerous to work rotary blowers in the daylight hours, although if it becomes necessary to work around the clock, there is no hesitation.

The rotary blower is an indispensable piece of snow removal equipment. They not only insure the public that the roads will much more likely be open, but also save money. In this county, we have been able to handle the snow with lighter plows since we have had the blowers. We still have heavy trucks, and there will always be a place for them. But the percentage of heavy trucks has been reduced.

Clinton County owns its picket snow fence and received from the State of New York payment on a per-foot basis for the erection, dismantling, and rental. During the 1954-55 winter, the county erected on its State Highways 11 miles of fence of which 20% was 6-ft. fence. There has been a gradual decline in the use of snow fence since the early 1930's. Previously, fence was in wide use in this area; Clinton County had at one time 54 miles of snow fence compared to the 11 miles today. It was proper enough then to have snow fence in great quantity, because snow removal equipment was weak and inefficiently designed; when snow in any amount fell on the pavement it had a good chance of staying there. Therefore, any device that would keep a cubic yard of snow off a pavement was worth having.

Today, the public demands better service, which means the constant patrolling of the highway with snow plows and the removing of a little extra snow is an easy matter.

Daily Work Hours

It has been the practice of this county for 9 years now to record on a chart the hours worked each day with snow removal equipment in the control of snow on the State Highways. Horizontally, represented on the accompanying chart are the months and days in the winter season, and vertically is plotted the number of hours worked by the snow removal units.

For example, if 10 units worked 10 hours each, we would have 100 unit-hours. When these are plotted, they resemble somewhat the New York City skyline. A chart of this nature is very revealing and useful over the years. It tells you the day in each year that the first plowing was necessary, when the storms occurred, and when the plowing ended. In one glance at the chart you can visualize just what kind of winter it was. Such a chart serves as a guide as to the time you may reasonably expect the first plowing as well as the last plowing.

Also, the chart will show how very different one winter season is from the other. For example, the total unit-hours worked on State Highways last winter was 15,145. Those hours exceeded any previous winter's work on record by 2⅝ times.

Snow removal in no county can be better than the personnel that handles it, and by that I mean the supervisory force, the mechanics, and the drivers. If there is a weakness any place along the line, the results will show even though a municipality might have the best shops and equipment available.

The supervisory staff must be experienced and competent men who are willing to work in the middle of the night as in the day. It is their duty to know what the equipment and operator can do, as well as to know the snow conditions. To know the snow conditions, the roads must be constantly patrolled in a storm. We find that doing this with pick-up trucks is quick and cheap. Reports from patrolling pick-ups are continually made to the central garage of the highway conditions and the garage superintendent is thoroughly informed. The supervisory staff should, also, inspire the drivers to give the best performance possible and by so doing every member of the organization is proud that he is a part of the snow removal force.

The mechanics must be experienced, must know the equipment, and must be willing to work "all hours."

In a storm that lasts for more than one day it is always difficult to have enough experienced and capable truck drivers. We have found that, when it appears, a storm will last more than 12 hours, one of the two drivers with a snow removal truck should take a rest and a less experienced man take his place. By so doing, there will always be one experienced driver with each piece of equipment.

Last season, the cost of snow removal on the 225 miles of State Highway was $82,791.20 which, of course, included rental of equipment at rates established by the State of New York. Snow fences cost for erection, maintenance, and dismantling was $7,428.36. These costs exceed those of any previous season because of the severity of the winter.

Contractor on Chamber of Commerce committee

Fred I. Rowe, partner and general manager of the W. L. Johnson Construction Company and Associates of Columbus, Ohio, is named to the Policy Committee for 1955-56 of the Chamber of Commerce of the United States.

Mr. Rowe is a member of the Columbus Chamber of Commerce, and of the labor relations committee of the Ohio Contractors Association and has held a number of important posts with AGC. His firm built the runways and taxiways for the first B-36 planes at the Wright-Patterson base, Dayton, as well as sections of the Ohio and Pennsylvania turnpikes.

Ohio contractors have job flagman program

The Ohio Contractors Association has inaugurated a program designed to promote safety on construction projects throughout the state. A large percentage of construction projects, says the Association, requires the contractor to provide flagmen for controlling traffic during operations performed on or near the travelled roadway. This is particularly true on bituminous concrete resurfacing projects, which are usually built under traffic. Contractors generally have had no identifying apparel for their flagmen that is easily recognized by the traveling public.



In an effort to promote safety during construction work, the Association has purchased sun hats for distribution to its members for use by flagmen. The hats are yellow with "Traffic Control" printed on the front in black letters.

The easily-identifiable color of the hats, and the proper method of flagging traffic, will help motorists in the control of their cars when approaching construction projects, the Association believes.



Most Modern Design!
Most Modern Power!

Get both in new Chevrolet Task-Force trucks. Modern styling that actually works for you! Modern power in the shortest stroke V8's* in any leading truck!

Styling that's designed to make money for you—It's a fact. The ultra-modern, Powermatic design of a new Chevrolet Task-Force truck calls attention to your business, favorably impresses customers and prospective customers! That's why on looks alone a Task-Force truck can make money for you. And it's *functional* styling. Panoramic windshield, new High-Level ventilation, concealed Safety Steps—these are styling features that double in brass to make the driver's job less of a chore. With safety and comfort increased, efficiency goes up. Tight schedules are easier to maintain and you keep the profits coming in on time.

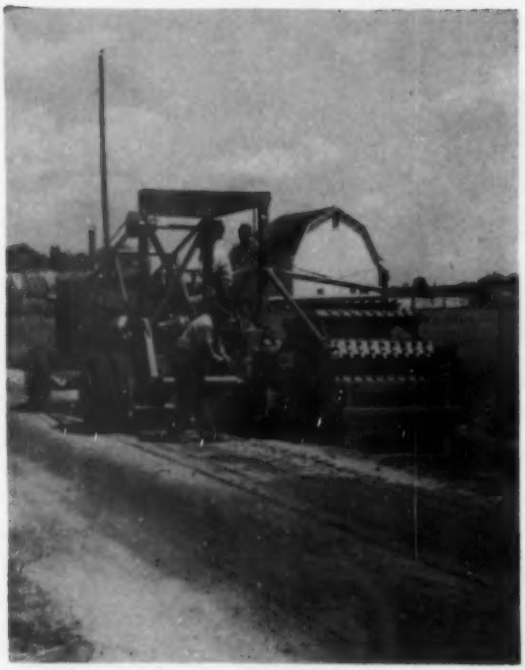
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**V8 standard in the new L.C.F. models, an extra-cost option in all others except Forward-Control models.*

NEW CHEVROLET Task-Force TRUCKS

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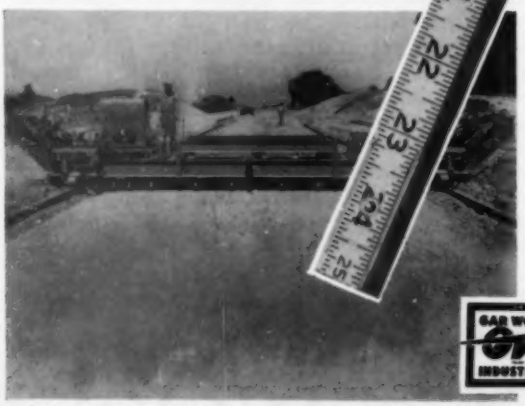
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HI-WAY WIDENER DIGS CLEAN TRENCH IN ONE PASS



WASTE IS ELIMINATED WITH THE SPREADER



POWER FINEGRADER CUTS GRADE EXACTLY TO SPECS

How to **IMPROVE** road building **TECHNIQUES**

GAR WOOD-BUCKEYE
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Digs up to a mile of highway widening trench a day for as little as $58! The *only* machine that presents a complete, low-cost method of excavating and subgrading along the shoulder . . . Digs a clean, graded trench of uniform width and depth in one pass, *without disturbing the subgrade.* Subgrade is ready to receive concrete or black top. Spoil discharged on either side of trench or directly into trucks with an optional loading conveyor. Cuts up to 48" wide and 18" deep. One-man operation.

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POWER FINEGRADERS

Your last grade-building step between paving profits and loss! Cut grade exactly to specifications all the way, ready for the paving crew, with NO high or low spots in any soil... Eliminate dollars lost in concrete for slab that's too thick; eliminate chance of penalties for slab that's too thin... Two models, for widths from 10' to 25'.

GAR WOOD INDUSTRIES, INC.
WAYNE, MICHIGAN

No. 5518

. . . for more details circle 259, page 14

Adams TraveLoader

Speeds Loading Operations

For Contractors



Like many other contractors, Gray & Fear, Woodbury, New Jersey, finds several profitable applications for Adams TraveLoader. This contractor says, "We use our TraveLoader on a wide variety of loading operations—loading gravel out of banks for resurfacing operations; loading from stockpiles and for loading surplus trench material on sewer contracts that we have. We particularly like the heavy construction, the good all-around visibility and the high-speed loading ability of this machine" . . . Ask your local Adams dealer to give you a working demonstration of how the TraveLoader will cut loading time and costs—for you!



Here a road contractor uses an Adams TraveLoader for picking up surplus dirt on a road-widening job.

For Counties



The Adams TraveLoader owned by White County, Ark. is used to profitable advantage in reditching operations in the process of maintaining proper drainage on its system of 3,600 miles of roads. County Judge Floyd E. Bradberry, says "Our TraveLoader does an outstanding job of loading surplus ditch and shoulder material and also creek bed gravel. We have found this machine to be readily adaptable to any of our needs. We like its simplicity and ruggedness—it has any loader beat that I have ever seen" . . . See your local Adams dealer for an on-the-job demonstration of the high-speed, high performing TraveLoader.



This county-owned TraveLoader is loading gravel from stockpile for road resurfacing operations.

A Product of Adams Division

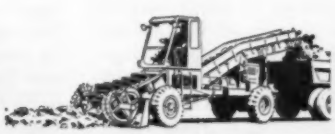
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ADAMS







Motor Graders TraveLoaders Pull-Type Graders



● McKiernan-Terry pile hammers in action on the Garden State Parkway sand drain project.

VERTICAL SAND DRAINS

Emerging as major Roadbuilding technique for stabilizing soft marshy ground

THE vertical sand drain principle, introduced in California, in 1934, now ranks among the leading methods for stabilizing soft marshy ground. One of the most important of its applications is in the consolidation of foundations for highway construction.

The Garden State Parkway, recently completed, is one of a growing number of projects in which vertical sand drains have been extensively employed. Other recent highway applications of the method were such projects as Route 99, which passes over a tidal peat bog in Washington State. Six thousand sand drains were driven there. A section of the New York State Thruway, near Onandaga Lake, was similarly stabilized by 2,500 sand drains.

The method is by no means limited to highway construction. Hundreds of sand drains, ranging from 15 to 90 ft. were driven by George M. Brewster and Son Co. in their work in 1949 on the extension of the Lincoln Tunnel approach at Secaucus, N.J. Both double- and single-acting McKiernan-Terry pile hammers and other McKiernan-Terry equipment were used. Over 3,000,000 lin. ft. of sand drains were employed in the building of the New Jersey Turnpike from the George Washington bridge to Linden, N.J. and from Woodbury to Deepwater, N.J. O. J. Porter of Porter, Urquhart and Associates, consulting engineer, was in charge of this project as a pioneer and a leading exponent of the vertical sand drain idea.

Their Application

Sand drains have proved particularly suitable where depths of 10 to 100 ft. are involved. In these instances, this method of soil stabilization is often 20 to 80% cheaper than other means of obtaining a stable fill. For example, the case of a highway in Puerto Rico, other methods of soil stabilization ranged up to 6 times as

costly. Sand is easily obtained usually and settlement is accelerated. Final stabilization is achieved in a year or two or less, as compared with up to fifty years or more necessary by natural settlement.

Essentially, a sand drain system consists of a series of sand columns driven through a blanket of sand into an unstable soil body. Water from the soil rises up the columns of sand to the sand blanket, from which it drains horizontally.

Construction Methods

The construction of a sand drain system begins with a determination of the depth of the unstable soil. A blanket of sand varying in thickness from 2 to 8 ft. as required by the depth of the drains is spread on the surface. The purpose of this is to support equipment and, as noted, to drain away water rising from below. A mandrel, made of straight pipe, hinge-closed at the lower end, is driven to the desired depth through the sand blanket and into the muck. A skip fills the mandrel with sand. The upper opening of the mandrel is then closed. Compressed air is forced into the mandrel, and the sand colmun is thus held in place while the mandrel is withdrawn by the crane.

The liquid muck, compressed by the overburden of fill, yields its water content to the sand columns, which are placed on 6- to 20-ft. centers, depending on the nature of the soil. Ultimately, the filled weight rests on soil particles instead of on the water within the soil. Through this action the underlying silt has been known to consolidate or settle vertically as much as 20 ft. without lateral soil displacement or "mud waves." As the dehydrated foundation retreats, compensating fill is added.

Equipment Requirements

Either single-acting or double-acting pile hammers may be used in the construction of sand drains. (The single-acting hammer raises the anvil block by steam or air pressure and then allows it to fall by gravity. The double-acting hammer adds steam or air pressure to the force of gravity). Each McKiernan-Terry pile hammer is fitted with a special cast alloy steel anvil block and mandrel cap. The sand drain mandrel is designed to allow the sand to flow properly and insure against air leaks. The effectiveness of the construction is demonstrated by one mandrel which served to drive 3,300 sand drains, averaging 55 ft. in length, for a total of 181,500 lin. ft. The same mandrel was used on a subsequent job to drive an additional 9,000 sand drains, averaging 16 ft. in length, for a total of 144,000 lin. ft.

Another difficult design problem was overcome in constructing light compression leads that could be handled easily by the crane and yet possess sufficient strength to resist buckling under the forces developed as the pipe is withdrawn from the ground. The mandrel, skip, and leads are also of McKiernan-Terry design.

Specific Uses of Sand Drains

In addition to its widespread use in highway construction, sand draining has been employed to stabilize underlying silt at naval bases in California. Sand drains were also used to rehabilitate La Guardia Airport, which was settling in swampy ground filled with rubbish and in the construction of many other airports. Vertical sand drains have been used to stabilize wet clay foundations as support for large earth fill structures. In 1948, the approaches to the Point Pleasant-Brielle (N.J.) Bridge were stabilized by 50-ft. sand drains, using single-acting S-5 McKiernan-Terry pile hammers and 80-ft. compression leads. In a similar application, a 2,000-ft. approach to the Fore River Bridge at Portland, Maine, was stabilized by 16-in. and 18-in. sand drains up to 100 ft. in depth.

● Final estimates on road jobs must be prepared within 65 days after satisfactory completion of the contract, under a new law passed by the Massachusetts legislature. The bill was introduced at the request of the New England Road Builders Association.

Illinois University studies soil-aggregate mixtures

A research project entitled "Soil-Aggregate Mixtures for Highway Pavement," being conducted by the University of Illinois Engineering Experiment Station in cooperation with the Illinois Division of Highways, is in its second year of progress.

The purpose of the investigation is to evaluate the effect of a number of variables on the service characteristics of the hundreds of miles of local soil-aggregate roads in Illinois. Research Assistant Professor E. Y. Huang is the investigator under Professor Ellis Danner.

There are many variables that affect the stability and durability of this type of road. In the construction of low cost roads these variables must be considered in the light of economic feasibility. For example in the control of aggregate gradation, the current belief still seems to be that low-first-cost materials (pit or quarry run) give lowest annual cost without too much sacrifice in performance.

This project should indicate under what conditions this is or is not the case. Other variables that must be evaluated in a similar manner are nature and quantity of binder, effect of admixtures and surface additives such as calcium chloride, quality of aggregate, frost, subgrade conditions and traffic.

The first part of this investigation deals with the use of soil-aggregate mixtures as a wearing surface. The objectives are:

1. Preparation of a manual of current practice on design, construction and maintenance of soil-aggregate roads.

2. Confirmation of or suggested changes in present design, construction and maintenance procedures.

3. Determination of a correlation between necessary quality of road surface and volume of traffic.

4. Preparation of an annotated bibliography including all references used.

A proposed second part would be a similar study of soil-aggregate mixtures used as a base for a higher type surface. The time required for the overall study is expected to be from five to 10 years with significant data expected within three years.

In order to get the maximum information from the counties regarding their practices, a 25-page questionnaire has been prepared to be sent to all county highway superintendents.

New York Thruway revenue continues to climb

Students of toll road planning will be interested in the steady growth of traffic, following a gradual beginning on the New York State Thruway. This road which now has nearly 400 miles open to traffic between Buffalo and the New York City area, carried 7,050,000 vehicle trips during the first seven months of 1955.

The point of greatest significance is the steady growth of patronage by truckers. Commercial revenues rose in July for the 13th consecutive month, totalling $1,867,893 for the seven months. Total revenue for the period was $6,965,000.

The mileage immediately out of New York City is being rushed to completion, which, together with other linkages planned will insure a continued rise in revenues for this big road.

Personals

George W. Koss passes

GEORGE W. Koss, founder of Koss Construction Co., of Des Moines, Iowa, died August 8 at age 76. Mr. Koss had seen his company, which he founded in 1914 and headed as president until his 1946 retirement, grow into one of the nation's largest paving firms.

The company has built roads and bridges in many states and in Latin America. It specializes largely in concrete paving, and has been a leader in perfecting the highly-mechanized methods employed for concrete road work today.



George W. Koss

Mr. Koss was educated as a civil engineer at Rensselaer Polytechnic Institute. After early experience in railway engineering and as head of an engineering forum, he organized the present company, specializing at first in bridges.

Mr. Koss is survived by his sons in the business. George C. Koss, president and treasurer, is well-known among fellow contractors as 1955 president of Associated General Contractors, and recent president of AGC's highway division. Richard B. Koss, another son, is company vice-president and secretary.

RUSSELL S. DEETZ has been made project manager for the Ohio Turnpike, according to an announcement by executive director Frank C. Dunbar, Jr. Deetz served as project manager for the 22-mile Eastgate Section now open to traffic and hereafter will be responsible for operations and maintenance on the entire 241-mile turnpike, which is scheduled to be opened to traffic late in the year. Before joining the Turnpike Commission, he had a long service record with the Ohio Department of Highways, including the position of chief traffic engineer.

WILLIAM E. DICKINSON, formerly Highway and Concrete Engineer for the Calcium Chloride Institute, in Washington, D.C., has been appointed Chief Engineer of the Institute.



William E. Dickinson

Automatic Free-wheeling 2-wheel drive for 4 W. Ds.



WARN *Automatic* HUBS

automatically engage or disengage the front wheels from the power train as you shift into 4-wheel drive, or back to 2-wheel drive.

Go farther, faster, easier—roads or no roads!

No matter where you drive, whenever you use 2-wheel drive it's fast, economical *free-wheeling* 2-wheel drive with Warn *Automatics*. For 4-wheel drive, shift! You have it, *plus something new*—torque-free high speed driving in 4 w. d.! Warn Hubs stop drag, save gas, gears, tires in 2 w. d.—make 4 w. ds. peppy as pick-ups! Install them now—use your 4 w. d. for any purpose! Automatic and Locking models for Willys at Willys Dealers only. For other 4 W. Ds. at dealers or write:

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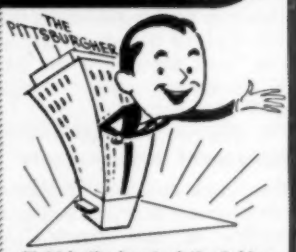


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Right in the heart of the Golden Triangle—Hotel Pittsburgher

400 outside rooms with bath. Large-screen television and radio at no extra charge in every room. Air conditioning. Two restaurants.
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Hotel Pittsburgher MOTEL

Opposite Greater Pittsburgh Airport on Airport Parkway west. 56 air-conditioned rooms with large-screen television at no extra charge, tile bath, private phone. Courtesy car to and from motel.
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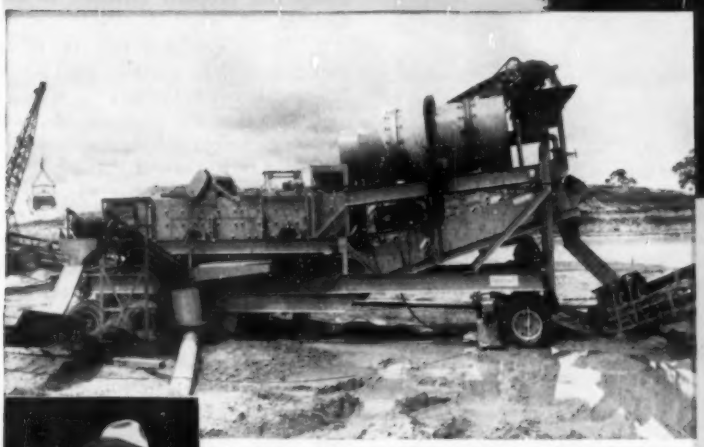
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JOSEPH F. DUDDY, GEN. MGR.

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THE CEDARAPIDS WASH-ALL

A portable washing and screening plant designed to meet rigid specifications for the new road program





"We're getting 150 tons per hour *meeting Illinois specifications*" says Bill Howard, President ROCKFORD BLACK TOP CONSTRUCTION CO. Rockford, Illinois
The new Wash-All Plant in Rockford Black Top's 100% Cedarapids set-up is meeting Illinois specifications right on the nose . . . producing No. 4 down, ⅜" to No. 4, 1" to No. 4 and 1" plus oversize . . . and turning out 150 tons per hour!

Meeting the quantity and quality demands of today's stepped-up highway program, *at a nice profit for you,* is the result of this all-new Cedarapids design. The Wash-All, with its many exclusive features, is the only *complete* portable washing and screening plant on the market! There's no additional equipment to buy to give you big-volume production of accurately graded washed aggregate. It's quality-designed throughout for low, low maintenance and operating costs...so you can make money *from* your equipment, instead of spending money *on* it! Compare the Cedarapids Wash-All, feature by feature, with any other portable washing and screening plant . . . ask your Cedarapids distributor for full information about the money-saving, money-making design details.

- Completely new 60" x 10' scrubber (optional) . . . the only *adjustable* scrubber on a portable plant!
- Scrubber driven by positive gear drive, instead of friction drive, to eliminate slippage and stalling under load.
- Lifting paddles, drive ring gear and drum tires bolted, instead of welded, for easy replacement.
- 3-ring baffles inside scrubber control speed of material; made in four segments and bolted in place.
- Removable ring at discharge end of scrubber can be changed to different diameters to control depth of material.
- *Horizontal* Vibrating Screen gives 12½% greater screening area than an inclined screen of the same size.
- Ten spray bars, each separately controlled by an adjusting valve, give individual control for each section of screen.
- Motorized Head Pulleys on all plant conveyors eliminate 70% to 90% of conveyor maintenance.
- All piping (standard equipment) installed at factory to insure correct diameter sizes of pipes for various components.
- 24" x 25' twin-screw washer-classifier-dehydrator used instead of a drag scraper tank.
- Sand is discharged into classifier- dehydrator far enough away from waste water flume to prevent unnecessary loss of fines.

Cedarapids Built by IOWA

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

. . . for more details circle 220, page 14

Erection and Use of Scaffolds

From "News Letter," Construction Section, National Safety Council

WHEN you get on a scaffold, whether it's on the ground and you are to help raise it, or whether you get onto it from a window above, you are taking your life into your own hands. There are more ways to get hurt or have an accident on a scaffold than on any other piece of building equipment, and when there is a scaffold accident there is more than a 50/50 chance of it being a fatal one. While swinging or suspended scaffolds are the most dangerous, built-up wood pole scaffolds can contain many defects in construction that will cause them to give way when used by too many workmen or stored with materials. Loading a built-up wood scaffold is often dangerous. It may not be securely nailed together, nor sufficiently braced, or of proper sized members to withstand a heavy load. If it is weakly built, it may collapse in a high wind.

● The following basic rules apply to all types of scaffolds:

1. See that they are properly inspected before you use them.
2. If the scaffold is to be used at a height more than 12 feet above the ground, see that it has a guard rail and toe board on the outer side.
3. Keep your scaffold free from all rubbish and waste material.
4. See that floor planks do not project more than 6 inches beyond the cross beams to prevent them tipping when you step on them.
5. Never leave your tools or any material on your scaffold at night.
6. In winter time, be sure to see that there is no snow or ice on the scaffold before you use it.
7. Notify your foreman of any weakness you may discover in a scaffold before you use it.
8. Never work on a scaffold formed of loose plank supported on barrells, boxes, brick or loose tile blocks.
9. When you are working on a scaffold with other men working above you, be sure that your scaffold has an overhead protection.
10. Never work on a scaffold during a high wind or storm.
11. Never jump from a scaffold to the ground.

● *Wood Pole Scaffolds.* On scaffold erection, the following basic rules apply to wood pole scaffolds:

1. See that all pole uprights are plumb.
2. If the poles are spliced, see that the squared end of the upper section rests squarely on the squared end of the lower section, and that the two ends are properly and securely spliced together.
3. Be sure that the poles do not stand on the ground, but foot on wood blocks large enough to spread the load over a sufficient area to prevent settlement. Nail the end of the pole to the block to prevent displacement.
4. See that this block of wood is not less than two inches thick and placed on solid ground.
5. If a pole is set on a sidewalk or anywhere other than on a wood block, be sure that the pole is securely braced
6. Be sure the splicing of the poles is not at the same level, but staggered.
7. See that the supporting ledgers are long enough to extend over two pole spaces and overlap the poles at each end by at least 4 inches.
8. Splice ledgers at the poles and never between them.
9. As the platforms are built up see that the ledgers which the lower platforms rest on are left in place to brace and stiffen the poles.
10. Nail or bolt the ledgers securely against the inside face of the poles.
11. If ledgers become split when they are being nailed up, or because a heavy load is being placed on the scaffold, be sure that the scaffold is not used until the split ledger has been replaced. A split ledger should never be left in place and simply renailed.
12. Be sure that the platform planking is at least two inches thick, and laid with their edges tight together.
13. When the distance from the ground to the lower platform of the scaffold is more than five feet, see that a ladder or runway is provided, and that ladders are provided between the working platforms of the scaffold.
14. If portable ladders are used, see that the bottoms are fastened to the platform to prevent displacement, and that the upper end extends at least three feet above the platform.

● *Suspended Scaffolds.* The following basic rules apply to swinging and suspended scaffolds:

1. See that all parts of these scaffolds are inspected daily.
2. Never use this type of a scaffold for the storage of material.
3. Not more than two men should work on a swinging scaffold at one time.
4. Be sure and test a swinging scaffold before you use it by raising it about 12 inches off the ground and loading it with at least four times the maximum weight that will be placed on it when being used.
5. See that life lines are provided for you and the other man working on a scaffold.
6. Each one of you should wear a safety belt properly attached to the lifelines.
7. Never combine two or more swinging scaffolds together with plank bridging between them.
8. See that the platform of your swinging scaffold is lashed securely to the building to prevent it from swaying.
9. When you are ready to leave a swinging scaffold lower it to the ground.

California highway cost index rises sharply

As anticipated by California highway engineers, the trend of costs on road work in that state veered up sharply during the second quarter of 1955 — 12.2% over the index for the first quarter, according to Richard H. Wilson, assistant state highway engineer. This follows a three-year period of only minor ups and downs in state road costs in California, the keen competition between contractors offsetting a rise in material and labor prices in some quarters reported.

During the second quarter, roadway excavation prices rose from $0.39 to $0.42 per cu. yd., a rise of 8%; untreated rock base was up 18% from $1.69 to $1.99 per ton; plant mixed surfacing rose a similar amount from $4.55 to $5.39 per ton; Portland cement concrete pavement was up 7%, from $13.44 to $14.46 per cu. yd.; structural concrete made the greatest jump, 26%, rising from $40.66 to $51.36 per cu. yd.

● Truck inter-city freight hauling during the first quarter of 1955 was 12.2 percent higher than the comparable period a year ago, setting a new first-quarter tonnage mark according to the American Trucking Association. Gains by regions varied from 5 percent in the Rockies to 16.2 percent in the central region. Automobile and building material tonnages rose to the largest of any freight category.

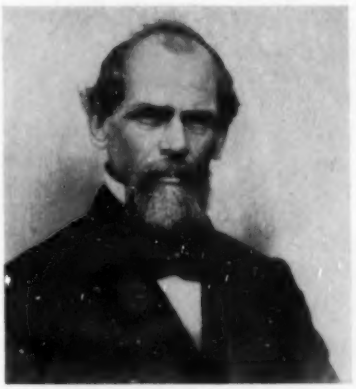
Century-Old Bridge To Be Monument

Suspension span at Wheeling is still important east-west link over Ohio River

PLANS are under way for memorial rites at historic Wheeling Suspension Bridge in recognition of the contributions of engineering to the United States, and to the ingenuity of the master bridge builder, John A. Roebling, who redesigned and built the structure in its still existing form.

First meeting to plan the occasion was held recently at the Wheeling Steel Building, attended by a group of prominent engineers, representing the Wheeling Chapter of the West Virginia Society of Professional Engineers and the counterpart of the organization in Ohio, as well as others interested in the project. Those in attendance were: M. D. Ayres, chief engineer, Wheeling Steel Corporation; Otis Bledsoe, of the engineering staff of Hanna Coal Company; R. C. Bundy, works engineer, E. I. Dupont de Nemours Company; R. S. Carnahan, personnel director of Wheeling Steel; Lloyd A. Chacey, executive secretary, Ohio Society of Professional Engineers; George L. Cobb, chief engineer, Columbia-Southern Chemical Corporation; A. C. Flanders, metallurgical engineer, Wheeling Steel; Frank H. Frazier, St. Clairsville; Douglas T. Greth, Union Metal Manufacturing Company engineer; Thomas A. Grove, Hanna Coal Company engineer; William K. Hanna, Cincinnati district manager for Roebling; Thomas Henderson of the Hanna engineering department; Robert A. Heyl, vice president, Seabright Construction Company; Paul J. McCullough, engineer, Cadiz Water and Sewage Department; R. A. Mudge, chief draftsman, Wheeling Steel; Guy E. Neeper, engineering staff of Lucas Company; Albert Neroni, Robling advertising manager; Forest Thaxton, mining engineer, Hanna Coal Company. Ayres, Carnahan, McCullough, Bledsoe and Neroni were appointed to the working committee.

The memorial will be in the form of a large bronze tablet suitably inscribed and provided by John A. Roebling's Sons Corporation of Trenton, N. J.



● John A. Roebling, bridge pioneer.

Repairs to the present bridge are planned in order to keep it in use. The memorial ceremony is planned for shortly after these repairs have been completed.

Invitations to the ceremony will be extended to the governors of West Virginia and Ohio and the presidents of engineering societies of both states. Other guests will include Dr. David B. Steinman, noted engineering authority and author of "The Builders of the Bridge," and F. W. Roebling, III, vice president-engineering of the Roebling Corporation and a great-great-grandson of John A. Roebling, whose Brooklyn Bridge still stands as a monument to his memory. An invitation also will be sent to the governor of Virginia and the president of the state's engineering society. The century-old span was constructed during the period when West Virginia still was a part of the state of Virginia.

Safety and saving

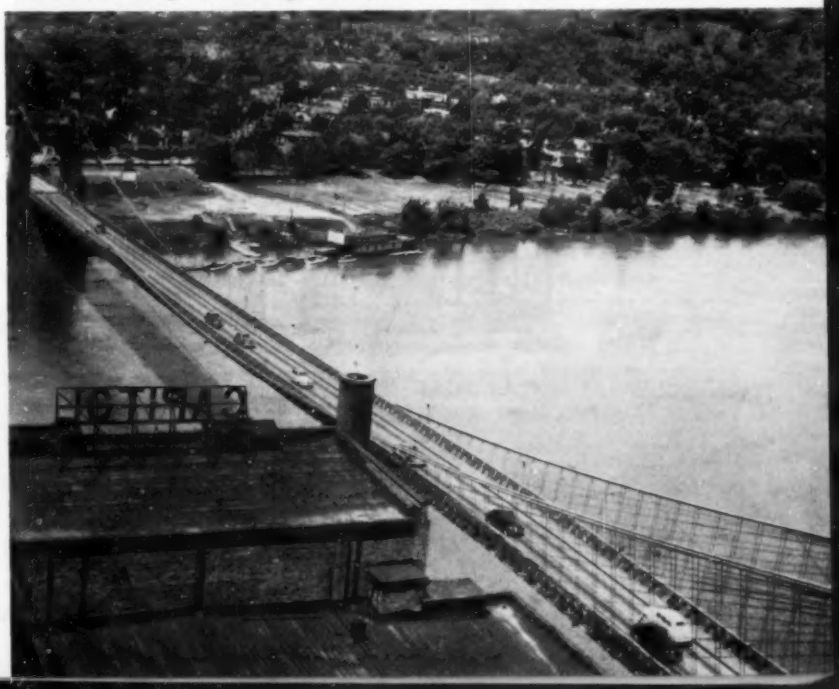
Safety is a by-word with some firms; with others it is a forgotten word. Safety among your own employees can mean dollars in your pocket through reductions in your Workmen's Compensation rate. Safety for the traveling public can mean savings on liability premiums and more savings for you if, by unsafe practices, your job is the scene of an accident.

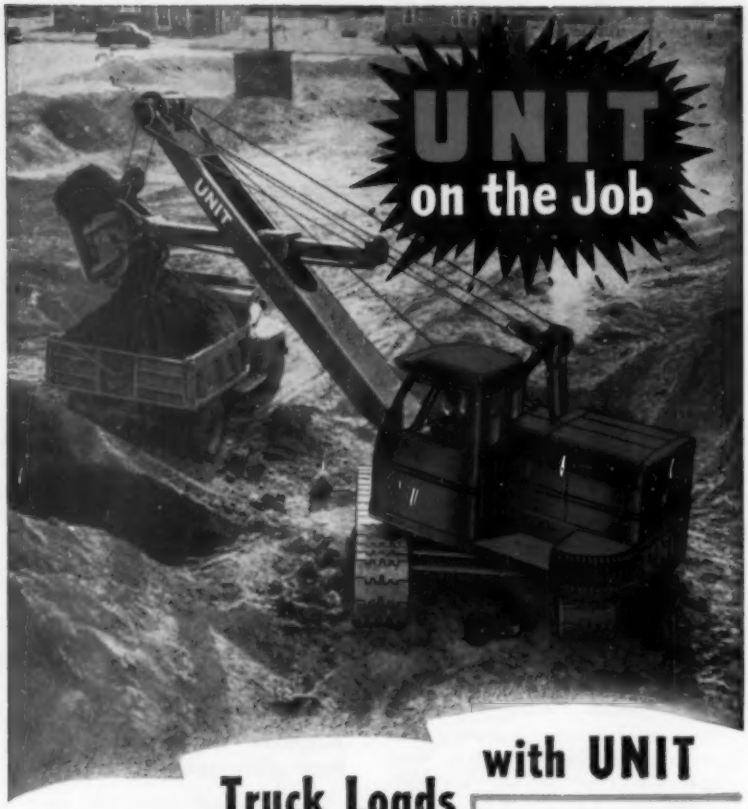
Bulletin, Virginia Road Builders Association

Another thruway link planned

Plans are in preparation for an early 1955 construction start on the 24-mile Berkshire section of the New York State Thruway, extending east of Albany to the Massachusetts line. This link will connect with the Massachusetts Turnpike now under construction, leading eastward into Boston.

● Century-old bridge at Wheeling to be repaired and dedicated.





Step-up Truck Loads with UNIT

Here's a UNIT ¾ yard Shovel that's "in there swinging" . . . making big payloads. UNIT'S balanced stability and power permit hard digging . . . produce maximum yardage at low operating cost. Fewer working parts cut down replacements required . . . reduce maintenance costs. The FULL VISION CAB enables operator to see in ALL directions . . . promotes safety . . . increases efficiency. Results in more loads per day and easier load handling. Get the complete UNIT story. Write for literature.

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½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



All Models Convertible to ALL Attachments!

. . . for more details circle 253, page 14

New Publications

Handbook on materials

The materials of manufacturing and construction in all branches of engineering are brought together for centralized identification and working comparison in "Handbook of Engineering Materials." Published in August by John Wiley & Sons, the new source book has been edited by Douglas F. Miner and John B. Seastone, and represents the combined resources of 51 specialists.

The increasing tendency for one branch of engineering to overlap with another provided the basic need and impetus for this exhaustive reference work. Here, the technical properties take precedence, with the book's emphasis on selection and use of materials, and major attention directed to adaptability to fabricating methods, availability, costs, and limitations.

Arranged by classes of related or similar materials, "Handbook of Engineering Materials" first provides general information on specifications and standards, statistics in the application of materials, and mathematical and physical tables. The second section is devoted to metals and includes ferrous metals, aluminum, magnesium, copper and its alloys, zinc, nickel and its alloys, other pure metals, and special purpose metals and alloys.

Details for non-metals are given in the third section. Wood and wood-base materials, paper, fibers, plastics and rubbers, organic finishing materials, fuels, carbon products, ceramic materials, industrial chemicals, and lubricants are the individual materials treated here.

Construction materials are covered in the final section, with the analysis directed to cementing materials and concretes, roadbeds materials, timber, rope, foundations, weather and moisture protection, and glass products.

Douglas F. Miner of Carnegie Institute of Technology was formerly with Westinghouse Electric Corporation, as manager of the materials and process engineering department. John B. Seastone is research and development manager, metals division, Olin Mathieson Chemical Company.

"Handbook of Engineering Materials," 1382 pages, is priced at $17.50. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.

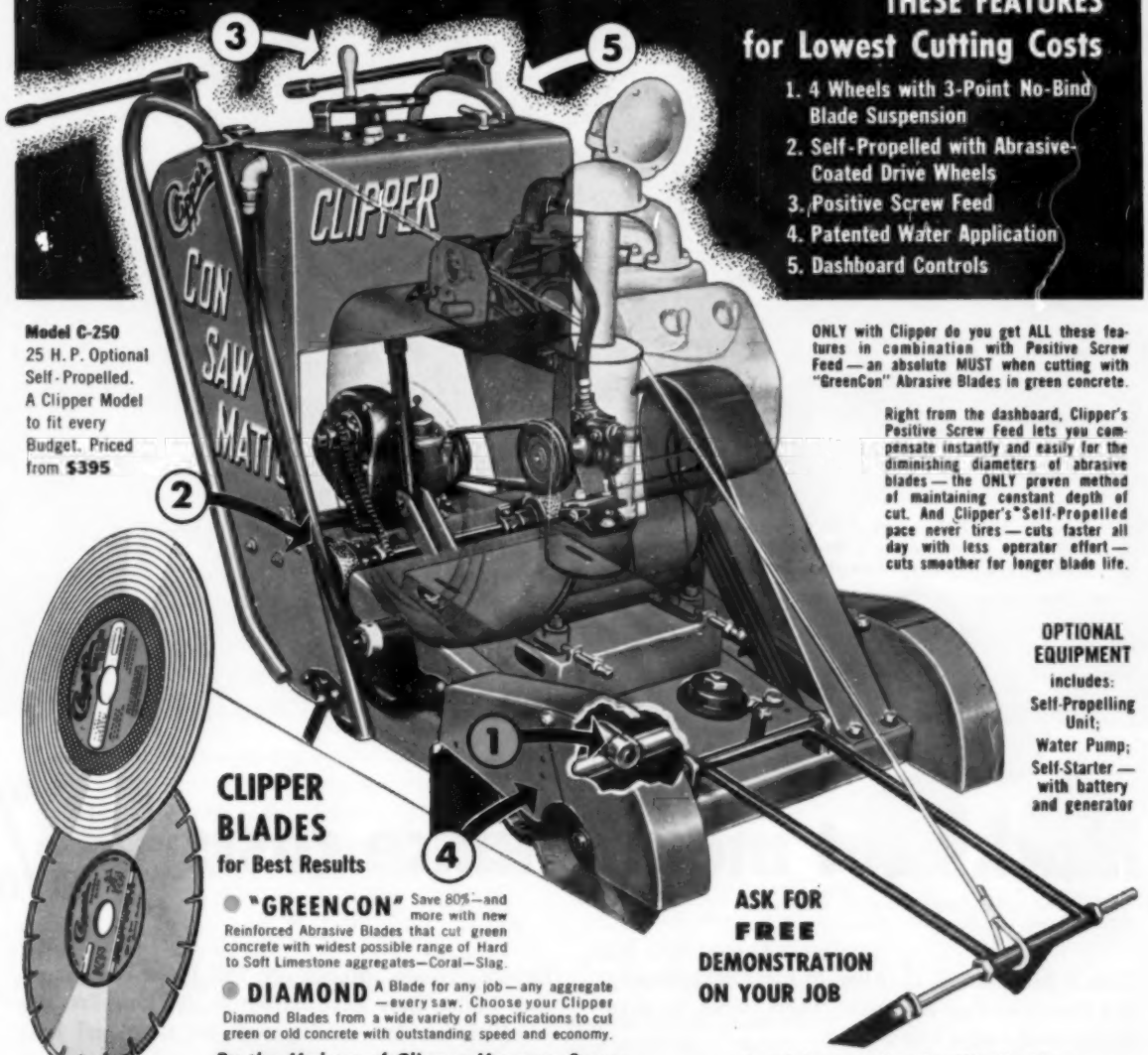
NOW—See For Yourself
WHY You Cut More Concrete With

Clipper
"SAWS THAT THRU"
CONCRETE SAWS

Look Inside—Behind the Engine for Famous Clipper Quality!

DEMAND THESE FEATURES for Lowest Cutting Costs

1. 4 Wheels with 3-Point No-Bind Blade Suspension
2. Self-Propelled with Abrasive-Coated Drive Wheels
3. Positive Screw Feed
4. Patented Water Application
5. Dashboard Controls



Model C-250
25 H. P. Optional Self-Propelled. A Clipper Model to fit every Budget. Priced from **$395**

ONLY with Clipper do you get ALL these features in combination with Positive Screw Feed—an absolute MUST when cutting with "GreenCon" Abrasive Blades in green concrete.

Right from the dashboard, Clipper's Positive Screw Feed lets you compensate instantly and easily for the diminishing diameters of abrasive blades—the ONLY proven method of maintaining constant depth of cut. And Clipper's Self-Propelled pace never tires—cuts faster all day with less operator effort—cuts smoother for longer blade life.

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Self-Propelling Unit;
Water Pump;
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CLIPPER BLADES for Best Results

● **"GREENCON"** Save 80%—and more with new Reinforced Abrasive Blades that cut green concrete with widest possible range of Hard to Soft Limestone aggregates—Coral—Slag.

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By the Makers of Clipper Masonry Saws

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City_____ State_____

. . . for more details circle 195, page 14



Two Mack B42's . . . part of the sixteen-unit fleet of the Allen's Ready Mix Concrete Company, Memphis, Tenn.

Macks cut maintenance costs 90%

Take it from Mr. S. G. Allen of the Allen's Ready Mix Concrete Co., Memphis, Tenn., when he says Macks really save him money.

Before he put Macks on his jobs, his monthly maintenance costs averaged more than $1,000. Since switching to an all-Mack operation of sixteen mixers and dumpers, he finds these average monthly costs for his entire fleet have been cut to less than $100!

As Mr. Allen puts it, "Macks have made an important contribution to the success of my business. In my opinion, Macks are the finest equipment ever built. They have no equals for long life, dependable service, minimum down time and low-cost operation."

High praise for Mack performance? You bet! But ask other owners and operators of Macks throughout the country and see how they agree with Mr. Allen. It's no wonder that in the construction industry the "word" is—it pays to standardize on Macks.

. . . for more details circle 229, page 14

MACK TRUCKS Empire State Building, New York 1, N. Y. 3357

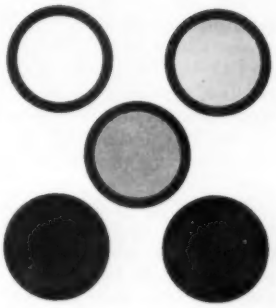
HOW TO PREVENT GLARE on air-entrained concrete roads



Glare on untreated concrete increases driver fatigue and road hazard . . . reduces visibility.

AE Dispersed Black makes concrete roads glare-free . . . improves visibility.

Unlike most "blacks" available, Horn AE Dispersed Black will not absorb or neutralize the air-entrainment in a concrete mix. It does not affect the resistance of the concrete to scaling. Horn AE Dispersed Black eliminates glare and, by heat absorption, assists more rapid de-icing. Horn AE Dispersed Black improves highway safety and appearance, winter and summer.



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. . . for more details circle 216, page 14

New Publications

Sawed joints in concrete pavements

The sawing of contraction joints in airfield pavements is a practicable and desirable method of constructing the joints, according to a report by the U.S. Army Corps of Engineers. This report is made available to the public by the Office of Technical Services, U. S. Department of Commerce.

The report covers an investigation of the concrete work at a number of air bases and a general study of joint construction. It states that the procedure which gives the best assurance of eliminating random cracking of pavements is to saw the joints consecutively at the required spacing in the sequence of concrete placement, as soon as the concrete can be sawed without damage. This procedure also results in more uniform opening of the joint during contraction of the pavement.

Projects studied were in paving lanes 25 ft. wide with thickness ranging from 6 to 20 in. All sawing was done with a single diamond saw blade. The report discusses pavement details, sawing equipment and procedures, specification requirements, evaluation of sawed joints, joint sealing, curing, costs and general comments of personnel connected with the construction, and includes recommendations for the standardization of specifications and procedures for sawed joints.

In addition to the experience records, a field study was conducted to determine the minimum depth of saw cut that could be used for dummy groove joints and included experimentation with several methods of widening the top of the saw cut to improve sealing of the joint with jet-fuel-resistant sealers.

This report, PB 111536 *Investigation of Sawed Joints in Concrete Pavement*, 39 pages including a bibliography on sawed joints, may be ordered from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Price is $1.00.

PARKING IN THE AIR WITH STRUCTURAL STEEL. A 24-page brochure published by the American Institute of Steel Constructors, Inc., 101 Park Avenue, New York 17, N. Y. Of general promotional interest in connection with the advantages of steel construction.

Traffic Safety and Control



● Signs like this are a welcome innovation for motorists, a logical public service for highway departments, and a means of helping commercial "over-signing."

"Roadside Services Ahead"

Signs tried in Illinois

PATTERNED after the signs which are a customary feature on turnpikes, new signs are being installed along U. S. 66 between Chicago and St. Louis, telling the motorist or trucker of roadside services ahead.

Under the direction of Harry H. Harrison, Engineer of Traffic, Illinois Division of Highways, signs are being installed through a plan to thus mark all Illinois highways of the limited access or modified limited access class.

Following the general style of advisory signs, black lettering on a white rectangular background, the new board reads, "Roadside Services Ahead." Below this legend are one or more additional panels reading, "Food" or "Lodgings" or "Car Services," or any combination, whichever is appropriate.



Signs of this type, according to Mr. Harrison, are considered to be a necessity today on modern highways where roadside facilities are without direct connections by private driveway to the express travel lanes. Without them the motorist, unfamiliar with the locale, often has difficulty in exiting from a modern expressway at the point best serving his personal needs. If the state highway department does not furnish such notices, roadside enterprises will, Harrison feels. The result will be a rash of competitive billboards for motels, gas stations and restaurants.

State highway user revenue up in 1954

Revenues for road-building and maintenance continue to swell as the traffic stream grows, it is revealed by figures reported by the National Highway Users Conference. According to date compiled from the Bureau of Public Roads $3,639,899,000 in state highway use taxes was collected in 1954 — $2.3 billion from motor fuel taxes, $1.2 billion from motor vehicle taxes and $83 million from motor carriers.

This is 6.98% above the 1953 collections. Motor carrier receipts show the greatest increase, 16.8%.

What's New
in Equipment and Materials

(See Page 14 for Reader Service Coupon and More Items)



New "Agitor" with 4-wheel body

New Truck Body for Hauling Concrete

Designed for use as a stationery ready-mix unit or for transporting concrete for paving and related work, a 4-yd. truck body, the "Agitor," is announced by Glenway Maxon, equipment consultant of Milwaukee. It is to be built and marketed by S&M Manufacturing Company, Mill Road, Milwaukee, Wisconsin.

The Agitor holds as high as 5 cu. yd. and will agitate 3½ yd. in a manner which meets ASTM specifications, according to the designer. It is designed for mounting on a single-axle truck small enough to be highly maneuverable for easy turnarounds at the paving site.

The feature of this unit which differentiates it from the well-known Dumpcrete unit sold by Maxon Construction Co., of Dayton, Ohio, consists of a specially designed agitator. The Agitor agitates concrete in transit or the concrete can be agitated only at the point of depositing, or not agitated at all, depending upon the preferences of the owner. It is claimed to be the only concrete conveying body which can economically handle any type of concrete, low slump or high.

Other features include high discharge height, visibility enabling inspector to check quantity and quality before discharging, very large gate and chute, power folding of chute. It can be controlled from the ground or from operator's platform.

The body is ruggedly built of Inland HiSteel with thick side plates and heavy reinforcement. The body can be loaded in 7 seconds, unloaded by chute in 30 to 60 seconds.

The designers emphasize that the Agitor conforms with all ASTM specifications for central mixed concrete wih agitated or nonagitated delivery.

For more information circle 106 on Service Coupon Page 14 and mail now.

Low Priced Portable Heater

A new "Thrifty" model portable heater under the Herman Nelson trade name, announced by R. C. Koehring, Portable Products Sales Manager, American Air Filter Co., Inc., Louisville 8, Ky., is claimed to be a radical departure from conventional heater design. The manufacturer claims that modern design and production techniques have been combined in the new unit to make available an indirect fired air heater in the low price field.

The new "Thrifty" heater is fired with ordinary fuel oil, but will burn gasoline just as efficiently when outdoor temperatures fall below the "firing range" of fuel oils. Heating capacity is manually controllable from 50,000 to 170,000 BTU per hour. Heated ventilation air is discharged under pressure by means of an electric motor driven blower. The heater may be used indoors or out, and canvas ducts can be used to spot heat where desired. Combustion gases can be separately vented to the outdoors whenever safe practice requires that precaution.

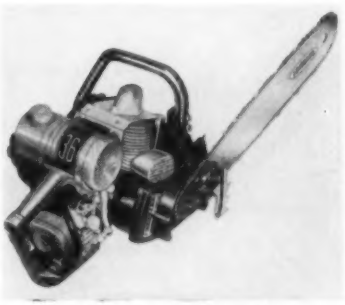


"Thrifty" Model Portable Heater

For more information circle 107 on Service Coupon Page 14 and mail now.

Chain Saw

New compactness, cutting power, and handling ease are claimed for the new Model 36 chain saw of Lombard Governor Corp., Ashland, Mass. "Pistol grip" power control and special shape of the chrome handle bar are stated to allow cuts to be made in the direction the operator chooses. A direct connected "Jet Fed" diaphragm pump of standard make gives full, smooth, non-stall power to the engine in any position. Engine displacement of the Model 36 is 4.7 cu. in., with 70 lb. compression, and the cylinder is of die cast aluminum with cast-in sleeve. Positive ignition switch, high voltage magneto, and waterproof protected spark plug cover assure extra dependability in all-weather starting.



Model 36 Lombard Chain Saw

For more information circle 108 on Service Coupon Page 14 and mail now.

Crack and Joint Filler

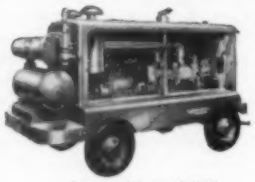
The new Kapseal crack filler has been announced by Keystone Asphalt Co., Division of American-Marietta Co., 101 East Ontario St., Chicago 11, Ill. The new rubberized compound may be used for sealing all cracks and joints in concrete and bituminous resurfaced pavements. Kapseal crack filler offers excellent adhesion to all pavement surfaces, and maintains its bond through successive cycles of expansion and contraction. It will not become brittle and crack during cold weather. Ease of application is another feature of the new product. The only equipment required is a conventional asphalt melting kettle and hand pouring pots.

For more information circle 109 on Service Coupon Page 14 and mail now.



Trenching 7 miles of street, this Jaeger "125" Roto ran two 80 lb. breakers to line-cut and break a 7" top of asphalt over brick — averaged 1200 sq. ft. per 8 hr. day—used only 1½ gals. of fuel per hr.

Jaeger "125" Rotary speeds street work



Jaeger Rotary "600"

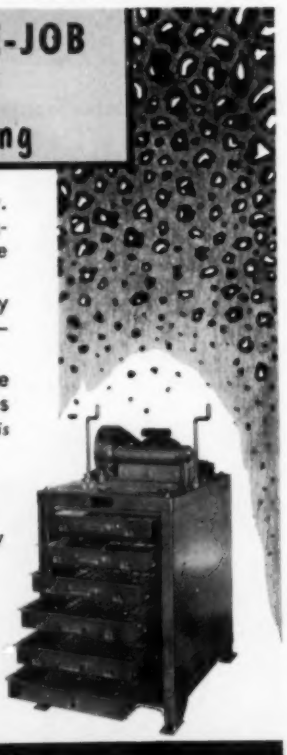
Instantaneous air delivery, under close and smoothly modulated control, enables the Roto 125 to maintain 100 lbs. minimum pressure under all demands up to 125 cfm. High efficiency results in slower speed operation, less fuel consumption, longer engine life than any other rotary. See your Jaeger distributor or ask for Catalog JCR5.

THE JAEGER MACHINE COMPANY 223 Dublin Ave., Columbus 16, Ohio

LOADER • PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINES

. . . for more details circle 261, page 14

Prevent DELAYS ON-THE-JOB with fast, sure GILSON Screen Testing



Foul-ups in sizing specifications can be costly. You can test every shipment of highway aggregate — quickly and accurately — with the **GILSON** Mechanical Testing Screen.

The **GILSON** Screen pays for itself many times over—and **GILSON** does the job *fast*—five minutes or less per complete test.

GILSON handles up to one cu. ft. of sample — crushed stone, gravel, slag, coal, ores

A Sand Attachment for handling 8-inch sieves is optional equipment.

Here's why you want GILSON

1. Makes tests quickly and accurately
2. Two to seven separations simultaneously
3. Screen trays independently removable
4. Trays balanced to same tare weight
5. Visible separation to refusal
6. Few moving parts.
7. Sturdy construction
8. Size range 4" to 200-mesh

NO MORE GUESSWORK ON SIZING
NO MORE TEDIOUS SCREENING BY HAND

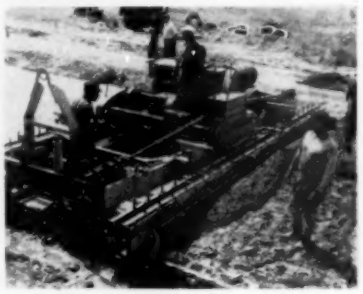
Write for information and prices

GILSON SCREEN COMPANY, Malinta, Ohio

. . . for more details circle 210, page 14

Compacting Screed Finisher

A new compacting screed finisher announced by General Machines, Inc., Niles, O., features screeds each 16 in. in width. On-the-job experience is stated to indicate that this machine is capable of "one-pass performance." Two models are being produced: No. 5-S, a completely portable machine with telescopic width adjustments from 10 ft. to 25 ft. and No. 4-S, a non-portable machine, also adjustable in widths from 10 ft. to 25 ft. The new GRM finisher is stated to operate smoothly with a minimum of side sway, thus eliminating the wear and tear on road forms. The finisher has six forward and six reverse speeds, plus four completely independent screed speeds.



GRM 5-S Compacting Screed Finisher

For more information circle 110 on Service Coupon Page 14 and mail now.

Paving Breaker Safety Handle

A safety handle for paving breakers, announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y., was developed as a result of many field requests for such a device to be used on tools in connection with demolition work where operators were injuring their hands when working close to walls or projecting masonry. The new safety device weighs less than 2 lb. and is available on the new Ingersoll-Rand PB8A paving breaker. It can also be purchased separately for attaching to existing PB8A models or earlier PB8's.

For more information circle 111 on Service Coupon Page 14 and mail now.

Tarpaulins Made of Nylon and Vinyl

A complete line of "Nyvel" tarpaulins and coverings and tents has been announced by Strength Incorporated, Sames St., Somerville, N.J. The "Nyvel" line is made from a new lightweight material which incorporates the use of nylon and vinyl plastic film. Among the features claimed for it are exceptional tear strength, complete and easy to store, water-proof, rot and mildew-proof, with sun fast colors. This material has met most rigid specifications of the armed services. All seams are electronically welded and sewn.

For more information circle 112 on Service Coupon Page 14 and mail now.

Another Cleaver-Brooks boiler in action!

Portable steam with a PUNCH helps make bridge go up faster



American Bridge Division, United States Steel Corporation, teams Cleaver-Brooks 125 hp boiler — with advanced methods of bridge construction

• Piles for this new bridge at Wheeling, W. Va., were driven at a rapid rate because constant steam pressure from a portable boiler assures smooth, powerful hammer action. Fast-steaming, clean, smokeless operation means extra economy, too. Modern push-button controls assure a full head of steam in 30 minutes or less from a cold start. Variations in hammer sizes or steam requirements present no problem — boiler operates at 80% efficiency from full load down to 30% of rating.



Use Cleaver-Brooks boilers anywhere. Here, skid-mounted unit is conveniently placed next to crane pile-driver. Service connections are conveniently located. Set boiler on blocks . . . and you're all set to go.

More facts on this modern, high-efficiency, portable or mobile self-contained boiler

- **TWO SIZES:** 80 and 125 hp, 150 lbs. working pressure
- **GASOLINE ENGINE** or electric powered, light oil-fired
- **TRAILER OR SKID-MOUNTED,** all-weather protected
- **SELF-CONTAINED,** compact, heavy-duty plant
- **CONSTANT STEAM PRESSURE** through automatic low and high fire control
- **ALL-YEAR USEFULNESS** — besides pile-driving and extracting, use boiler for asphalt plant, ready-mix and winter concrete operations, thawing and miscellaneous heating.

For complete details write for bulletin "Modern Pile-Driving and Extracting," Cleaver-Brooks Company, Dept. K, 395 E. Keefe Ave., Milwaukee 12, Wis.



Cleaver Brooks

BUILT WITH THE FAMED FOUR-PASS HIGH-EFFICIENCY DESIGN BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

. . . for more details circle 192, page 14



International TD-A Diesel Crawler Tractor

Diesel Crawler Tractor

Greater power, greater durability, greater operating ease and comfort and a smart new appearance are outstanding features of the increased horsepower International TD-18A diesel crawler tractor, now in production by International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

Power in the new model has been increased to 103 drawbar horsepower. The drawbar pull is 24,300 lb. at rated governed speed of 1450 r.p.m. The new, heavier power train gearing is designed for trouble-free transmission of the increased horsepower from clutch to tracks.

The TD-18A has six forward and two reverse transmission speeds, ranging from 1.6 up to 5.5 miles per hour — designed to give a correct speed for every job and assure full horsepower utilization at all times.

Productivity has been still further increased by strengthening track frames, rearranging control levers compactly and conveniently, providing positive-locking, tiptoe-action brakes, and giving the operator greater comfort so he can do a better job without tiring.

Track frames on the new model have been made 300 per cent stronger, with machined surfaces to assure permanent fit and positive, permanent track alignment.

For more information circle 113 on Service Coupon Page 14 and mail now.

Power Reversible Snow Plow

A new power reversible, trip blade snow plow has been added to the line of Frink Sno-Plows, Inc., Clayton, 1000 Islands, N.Y. Being a reversible snow-plow, it can be used to bull-doze or angle 10, 20, 30 or 37 degrees, to right or left, thereby carrying snow to either side as the condition or locale dictates.

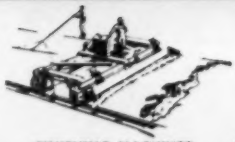
The moldboard is a welded structure of No. 10 USS gauge steel, panelled and ribbed for additional strength and rigidity, provided with a replaceable full-length stationary deflector. The cutting edge reinforcement is a structural angle of a weight suited to each model, electrically welded to the ribbed framework of the moldboard. High carbon, abrasion resistant steel cutting edges are bolted to the moldboard for easy replacement.



Ask about the BLAW-KNOX "Complete Package" of CONCRETE PAVING and READY-MIX EQUIPMENT



CONCRETE SPREADER-VIBRATORS



FINISHING MACHINES



AGGREGATE BATCHING PLANTS



HI-BOY TRUKMIXERS

. . . for more details circle 185, page 14

NEW JERSEY
PENNSYLVANIA
MAINE
OKLAHOMA
WEST VIRGINIA
NEW YORK
KENTUCKY
NEW HAMPSHIRE
OHIO
NOW INDIANA



PETER KIEWIT SONS CO. uses a 22½-ton Lorain Moto-Crane, model MC-424, with 50-ft. boom, handling concrete bucket on railroad overpass construction on $5-million contract C-6 east of Gary. This Omaha, Nebraska, contractor has purchased 44 Lorains.



TAYLOR WHELESS & CO. of Jackson, Mississippi (joint contractors with Winston Bros.) use a 20-ton Lorain Moto-Crane as a dragline to excavate footings for an overpass on contracts C-17, 18, 19 ($7,500,000) near La Porte, Indiana. Also used to handle concrete, forms, steel and clamshell excavation.

ANOTHER TURNPIKE
MORE LORAINS... *MORE* PROOF!

Ever since the first yard of earth was moved on America's first super-highways, Lorains have been a familiar sight . . . from the Pennsylvania Turnpike to the current Indiana Turnpike. Hundreds of Lorains have seen duty on these closely bid, tightly scheduled contracts. Contractors' names through these years on these jobs are the "Who's Who in American Construction."

Now, the 156-mile, $280-million Indiana Turnpike is the latest of these "proving grounds" for Lorains as they help dig the 50,200,000 yds. of material, help pour the 300,000 yds. of concrete on the 260 structures, help place the 86,000 tons of steel.

Shovel-crane equipment, particularly on vast projects like this, must fit many kinds of work — digging, casting, erection, material handling, to mention a few. Lorains do that best of all because of the tremendous selection of shovel-crane sizes through 2½-yard shovels and up to 61-ton crane capacities . . . plus the convertibility to all front ends . . . plus many types and sizes of rubber-tire and crawler mountings available for any terrain or travel conditions.

Many years and many turnpikes are your proof that Lorains will lick rough, tough, fast-scheduled jobs . . . and prove they'll *move more material, faster, cheaper, on your job, too!*

THE THEW SHOVEL CO., LORAIN, OHIO







(1) This 1½-yd. Lorain dragline uses a 60-ft. boom to dig drainage ditches 6 feet deep, 28 feet wide, at the rate of 250-ft. per day on the Carlson-Fleming subcontract near Rolling Prairie, Indiana.

(2) Winston Bros. of Minneapolis (joint contractors with Taylor Wheless & Co.), an 8-time Lorain owner, use a 25-ton Lorain Moto-Crane to handle 1¼-yd. concrete buckets to pour box culverts, handling about 30 loads per hour. This Moto-Crane is assigned to many other varied duties all over the job.

(3) This Lorain 30-ton Moto-Crane, model MC-524, with an 80-ft. boom pours concrete for an overpass on the S. J. Groves & Sons Co. contract near La Grange, covering 12 miles and totalling $6,740,000.

. . . for more details circle 249, page 14

THEW **LORAIN**



Model 3010 PRT Power Reversible Snow Plow

These are reversible for double wear.

On each model, two cast chilled malleable iron shoes are bolted to the underside of the cutting edge reinforcement for easy replacement. In addition, scuff shoes are bolted at each end of the moldboard as protection when plowing next to curbings.

The reversing mechanism is fully automatic, controlled by one lever in the cab of the truck. The design of this mechanism permits reversing when the plow is in any position, on the ground or raised. Actuation of this mechanism automatically unlatches the plow, angles it by means of two double acting hydraulic rams, and re-latches it in the new position. The latch is mechanical and so constructed that no load can be applied to either ram, by the plowing action when the plow is in any latched position.

Another exclusive feature is the preloaded trip spring mechanism with linkage to the moldboard. This permits a smooth swift tripping action when an obstruction is encountered and a quick easy return to normal plowing position when it is passed. The construction of this mechanism provides a "free floating" moldboard action and eliminates entirely any chatter at the cutting edge.

For more information circle 114 on Service Coupon Page 14 and mail now.

Subgrade Planer

A new completely adjustable subgrade planer, announced by General Road Machines, Inc., Niles, O., features multiple telescopic and vertical adjustments. The subgrader is made in two models with telescopic widths from 10 ft. to 15 ft. and 20 ft. to 25 ft. Both models can provide vertical settings up to 16 in. Slotted holes on grader blades and positioner plates allow simple, yet accurate settings, while the large front wheel screw adjustments permit minute thickness of slabs. In addition, rear wheels have a four-step pin lift for vertical alignment.



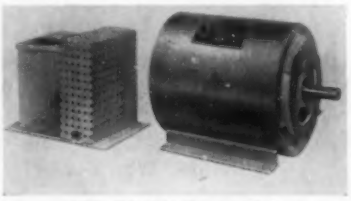
GRM Subgrade Planer

For more information circle 115 on Service Coupon Page 14 and mail now.

Portable AC Power Unit

A new portable source of AC power, the "Mo-Bil-Ac," developed by Star-Kimple Motor Division, Miehle Printing Press & Mfg. Co., 200 Bloomfield Ave., Bloomfield, N.J., delivers up to 10 KW at 110-220 volts and is stated to greatly extend the use of power tools and motor driven machinery in locations away from power lines or during power failures. Utilizing as a prime mover the engine of the vehicle in which it is carried, the unit supplies alternating current at commercial voltages and frequencies, single or polyphase.

Big feature of the MO-BIL-AC is its compactness and light weight. The 2-pole alternator, which forms one-half of the two-part unit, may be mounted under the vehicle hood and driven by a V-belt from a sheave on the crankshaft in front of the fan pulley, or by a power take-off. To keep down size and weight, excitation is provided by rectifying a part of the alternator output instead of using a rotating exciter.



"Mo-Bil-Ac" Power Unit

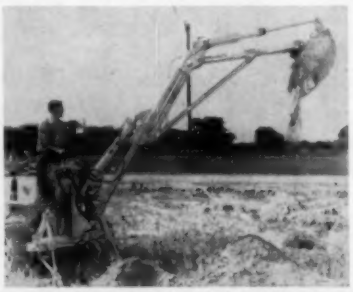
The other half of the system is the regulator, a static unit of the magnetic amplifier type with a selenium rectifier to provide alternator excitation. Operating characteristics are carefully matched with those of the alternator for optimum performance. Measuring only 10 x 6 x 7 in., the regulator has encapsulated windings for protection against moisture and vibration.

For more information circle 116 on Service Coupon Page 14 and mail now.

Ditcher Attachment for TerraTrac Tractor

The adaptation of the Shawnee Scout Model 70 ditcher for installation on TerraTrac "300," "400," and "500" crawler tractors has been announced by the Shawnee Manufacturing Co., Inc., 1947 N. Topeka Blvd., Topeka, Kan. Several new features have been added to the Scout for the TerraTrac crawler tractors, such as individually controlled, self-leveling hydraulic outriggers which keep the unit level regardless of the slope of the ground. Also, if a tractor is equipped with a Terraloader in conjunction with the Scout 70, both units can be operated off the loader pump. Removal of four bolts and two pins permits removal of the Scout in a few minutes.

The Scout ditcher digs 12 ft. deep, loads 8-1/2 ft. high, and reaches 14 ft.



Scout Ditcher on TerraTrac Tractor

For more information circle 117 on Service Coupon Page 14 and mail now.

Single Axle Trailer Dump

A new single axle trailer dump, designed for operation with single rear axle tractors, has been announced by Galion Allsteel Body Co., Galion, Ohio.

Known as Model SSM Transporter, the new unit is said to be ideal for materials hauling use, especially in localities where weigl.t laws allow high individual axle weight limits combined with relatively low gross weight. Exceptional stability both on the highway and in dump position is an outstanding feature, the manufacturer says.

Model SSM Transporters, available in body lengths from 16 to 20 ft. and with payload capacities of 10 to 20 cu. yd. are equipped with rear mounted Model 77142 Duo-ram hoists with 18 ton capacity.

According to the manufacturer, construction of the Model SSM combines maximum strength with minimum weight. Ten gauge high resistance steel is used throughout the body. Closely spaced 4-in. channel crossmembers are welded to 6-in. I-beam longitudinals. The fabricated steel chassis is fitted with Stablride or semi-elliptic leaf spring suspension. A full selection of brake types, axle capacities, tires and optional equipment is offered.



Model SSM Transporter Trailer Dump

For more information circle 118 on Service Coupon Page 14 and mail now.

Diesel Motor Grader

The new Model D diesel motor grader, announced by Tractor Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis., has a new Allis-Chalmers 6-cylinder, valve-in-head diesel engine rated at 50 brake max. h.p. at 1625 rpm. The Model D motor grader will continue in the line with gasoline engine. The new

diesel engine has a 3-7/16-in. bore and 4-1/8-in. stroke, and 230 cu. in. piston displacement.

Direct electric starting on diesel fuel is provided by a 12-volt starting system. Incorporated in this new engine are features such as replaceable wet-type cylinder liners; by-pass cooling system with high capacity water pump; pressure lubrication; aluminum alloy pistons; simple, easily serviced fuel injection system; and four filters to assure clean fuel.

Weight of the Model D diesel is 9,350 lb. with 2,760 lb. on the front wheels, and 6,590 lb. on the rear wheels. Blade pressure is 4,900 lb. Speeds with 7.50x20 tires range from 2.6 mph in first gear to 25.2 mph in fourth gear.

Basic design features of the Model D such as Roll-Away moldboard, single member tubular frame, tandem drive, compact and rugged gearing, heavy drawbar and one-piece circle are included in this Diesel-powered grader.

Special equipment includes 135 degree power circle turn, leaning wheel with 25 degree range each way, power-shift moldboard, mid-ship mounted scarifier, 12-ft. moldboard, 10-ft. moldboard with end bits, 2-ft. extensions, cab, snow plow, windrow eliminator, shoulder maintainer and rear-end loader.

For more information circle 119 on Service Coupon Page 14 and mail now.

6 Cu. Yd. Hydromixer

A new 6 cu. yd. Hydromixer with 193 in. wheelbase, announced by Willard Concrete Machinery Sales Co., 11700 Wright Road, Lynwood Road, Lynwood, Calif., is claimed to mix in travel 6¾ cu. yd. with less than a 32,000 lb. load on rear tandem axles. It has a revolutionary new hydraulic drum drive which is powered by a front mounted, two-speed power take-off. This is stated to eliminate the weight and cost of an extra engine as well as the customary high cost of fuel and maintenance. Charging, mixing and discharging are easily controlled by simple two-way hydraulic valve. There is no rollback or surging with this hydraulic system. A total weight of 7100 lb. for the Hydromixer is stated to permit maximum payload and extra water capacity.



6 Cu. Yd. Hydromixer

For more information circle 120 on Service Coupon Page 14 and mail now.

FLINTKOTE

Paving Products

for highways, streets, airfields, driveways

FLINTSEAL* . . . hot-poured rubber asphalt joint sealing compound for concrete pavements . . . bonds perfectly through all extremes of weather . . . prevents water infiltration much more effectively than old-style tar and asphalt fillers. (Formulated to meet Fed. Spec. SS-S-164.)



FLINTBINDER* C-2 . . . a specially compounded hot-mix tar-rubber binder for jet fuel resistant flexible pavement at airfields subjected to the effects of jet powered aircraft operations. Used extensively in U. S. Corps of Engineers tests for U. S. Air Force bases . . . both new construction and resurfacing.



FLINTSEAL* JFR . . . jet fuel resistant type of hot-poured compound. Used extensively by U. S. Air Force and U. S. Navy on cement concrete pavement serving jet aircraft. (Formulated to meet Fed. Spec. SS-S-00167.)



FLINTAR† . . . specially compounded coal tar emulsion for surface sealing bituminous pavements on airfields subjected to jet engine fuels, oils and greases . . . increases pavement life.



FLINTKOTE CPS . . . cold-poured type rubber asphalt joint sealer for effective sealing of concrete pavement . . . extruded into joints under pressure. (Formulated to meet Fed. Spec. SS-S-159, C.A.A.P-615 and others.)



ORTAR† D. S. EMULSION . . . for sealing asphalt paved surfaces of home driveways, bus stations, parking lots, streets and roads to provide oil resistance and protection from drippings of motor vehicles.

Write for complete technical data and literature

FLINTKOTE

Products for Industry

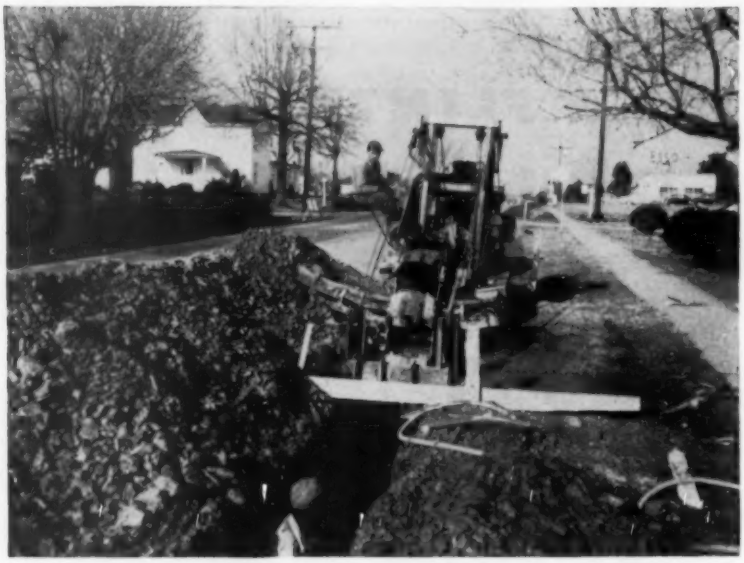
THE FLINTKOTE COMPANY, INDUSTRIAL PRODUCTS DIVISION
30 Rockefeller Plaza, New York 20, N. Y.

BOSTON • CHICAGO HEIGHTS • DETROIT • LOS ANGELES • NEW ORLEANS • PHILADELPHIA

In Toronto, Ontario: THE FLINTKOTE COMPANY OF CANADA, LTD.
In London, England: Industrial Asphalts Company, Ltd.

*REG. U. S. PAT. OFF. †TRADEMARK OF THE FLINTKOTE COMPANY

. . . for more details circle 202, page 14



F. L. SHOWALTER'S OPERATOR really has an unobstructed over-all view of the entire trenching operation on this water and sewer line job in Remington, Va. On his Model 95, as well as on *all* Clevelands, correct placement of foot and hand controls provides the operator's station with complete visibility at all times. Operators like the way Cleveland's powerful digging wheel and maneuverable full crawlers respond instantly to the easy-acting controls. Your local Cleveland distributor will be glad to show you how Clevelands *dig more trench . . . in more places . . . at less cost.* THE CLEVELAND TRENCHER CO., 20100 St. Clair Ave., Cleveland 17, Ohio.

. . . for more details circle 194, page 14

COLD WEATHER

Can't stop Chicago contractor Helmar Hedman and Summeraire



300,000
BTU's PER HR.
. . . yet priced 20-30% lower than smaller heaters

Clayton

SUMMERAIRE ***PORTABLE, OIL FIRED SPACE HEATER***

Helmar Hedman, like all contractors, makes money when jobs are finished on time . . . *weather or not.* Summeraire chases winter cold . . . dries out new construction; prevents freezing of concrete while curing; keeps workmen warm. Durable, portable, self contained; electric or gasoline engine drive, Summeraire delivers 2400 cu. ft. high velocity heated air per minute at amazing economy. 300,000 BTU capacity at a price 20-30% lower than that of smaller heaters.

for Fast, Low Cost
HEATING
DRYING
THAWING

CLAYTON MANUFACTURING CO., Box 550 El Monte, California RS-9
Without obligation, send complete details, prices and name of nearest Summeraire dealer.

NAME_____

ADDRESS_____

CITY_____ STATE_____

. . . for more details circle 266, page 14

Grass Trimmer

A new electric grass trimmer has been introduced by Porter-Cable, 41 Exchange St., Syracuse 8, N.Y., to take the back-breaking work out of trimming where mowers can't be used along walks, against walls and fences, around trees, under shrubs and up steep slopes. It also serves as an electric scythe to cut tall, coarse grasses and weeds, and to clean debris out of old gardens.



Electric Grass Trimmer

For more information circle 121 on Service Coupon Page 14 and mail now.

Device Makes Tube Removal Easy

A new device that helps tire servicemen remove badly stuck inner tubes and casings without time-wasting pulling and struggling has been announced by Akro-Mills, Inc., P.O. Box 989, Akron 9, O. Known as the Wonder tire deflator, the device made of aluminum, is designed to work on any air hose. When air is applied to the deflator a suction is created that whisks all the air out of a tube or tubeless tire collapsing and freeing the tube so it tumbles right out of the casing, or breaking the beads free of rim. All the solution from liquid filled farm implement tubes can be siphoned out in a few seconds by using the device in the same manner.

It is stated that tire men should find this tool particularly useful in demounting "Lifeguard," truck, airplane, earth-mover and farm tractor tubes; tubes "welded" to casings; and tires mounted on tubeless tires.



Wonder Tire Deflator

For more information circle 122 on Service Coupon Page 14 and mail now.

Tractor-Shovel Features New Complete Power Shift Transmission

The third, and largest, of the completely new four-wheel-drive tractor-shovels to be added to the "Payloader" line has been announced by the manufacturer, The Frank G. Hough Co., 768 Seventh St., Libertyville, Ill. Designated as the model HO, this newest unit has a



Model HO 2 Cu. Yd. Payloader

capacity of 2 cu. yds. It is similar in styling and outward appearance to the 1 and 1-1/2 cu. yd. models HU and HH which were recently introduced.

The outstanding features of "pry-out" bucket action; 40 degrees of "breakout" at ground level and new standards of safety and stability are common to all three new models. In addition, the new HO "Payloader" features a newly developed complete "power-shift" transmission. Not only has the clutch pedal been eliminated but the "power-shift" is labeled "complete" inasmuch as all shifts through all speed ranges in both forward and reverse can be made without coming to a stop or even slowing down. This new complete "power-shift" transmission simplifies the driver's work and thus adds considerably to the speed and productive capacity of the machine.

The "pry-out" bucket action is accomplished by using breakout pads on the ground as a fulcrum for leverage. Opposing load forces are transferred to the ground through the pads during the "breakout," instead of to the axles, wheels and hydraulic system. The 40 degrees of bucket breakout which is accomplished at ground level permits retaining larger heaped loads. The over-all length of the machine is actually less with the bucket at this ground level "carry" position than with the bucket in digging position.

For more information circle 123 on Service Coupon Page 14 and mail now.

Rubberized Asphalts

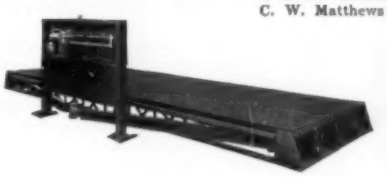
A new complete line of rubberized asphalts has been developed by Berry Asphalt Co., P.O. Box 800, Magnolia, Ark. for highway surfacing and joint filling, roof coatings, waterproofing and corrosion control. Combining the resiliency of rubber with the weather resistant qualities of asphalt, the new compounds are the result of a blending process developed in Berry Laboratories.

Live rubber is actually dissolved in the asphalt and yet none of the resilient qualities of the rubber are sacrificed. The blend of the two substances remains pliable when cold and holds firm when hot, doesn't become brittle and cracked in winter or runny and sticky in summer.

Another Contractor Specifies *Portable Truck* THURMAN SCALES



A 20-ton Thurman Portable Truck Scale owned by C. W. Matthews Contracting Co., Marietta, Georgia.



- ACCURATE
- DEPENDABLE
- PORTABLE
- PROVEN

Day-after-day more contractors are selecting THURMAN Portable Truck Scales. Hundreds of contractors in all parts of the country like the truly portable features of this scale as well as the versatility. For instance, the C. W. Matthews Contracting Co., as illustrated above, has utilized their THURMAN Portable Truck Scale in a permanent type installation. Yet, at a future date, this scale may be easily moved to a different site.

Then too, contractors like the dependable service that they get from THURMAN Portable Truck Scales. Time-proven in all types of installations, Thurman Portable Truck Scales provide a new concept in portable weighing. For detailed information on these scales, as well as prices and delivery, write on your letterhead for Bulletin 601.

OTHER THURMAN SCALES

Batching Scales
Liquid Weighing Scales
Portable Truck Scales
Industrial Scales
Pitless Scales
Pit Scales
Warehouse Scales
Wheelbarrow Scales
Electronic Scales

Precision Products Since 1918

THURMAN MACHINE COMPANY

DEPT. C, 156 NORTH 5TH ST., COLUMBUS, OHIO

. . . for more details circle 260, page 14

Rubberized asphalt is available in several forms: a roofing or paving compound, a liquid coating, or an aluminized liquid coating which has a metallic aluminum finish. A treated rubber additive is also available for on-the-job mixing with ordinary asphalt.

For more information circle 124 on Service Coupon Page 14 and mail now.

Light Weight Chain Saw

A new lightweight chain saw, the Super 33, announced by McCulloch Motors Corporation, 6103 West Century Blvd., Los Angeles 45, Calif., weighs only 22 lb. In addition to more horsepower and thus faster cutting performance, the Super 33 has many design features to assure easy handling and low maintenance. These include a full wrap-around chrome-plated handle, improved accessibility, increased cooling, and a new and improved sawdust and sprocket guard.



Super 33 Chain Saw

For more information circle 125 on Service Coupon Page 14 and mail now.

Equipment Trailer Has New Feature

A new machinery trailer, announced by Buhl Machine Works, Buhl, Idaho, is a conventional tilt-bed trailer with the added new feature of the shifting axle. The hitch is connected to the frame and not the axle. Its design makes use of the top of the tires to shift the axle forward and back.

Unlock the axle and back, and the wheels roll under the outer ends of the planking, carrying the bed and load on top of the tires. In this position the bed is low and solid to load onto. And another very important feature, in this position the truck can be backed against the trailer, and the trailer used as a ramp for loading and unloading the truck. To raise the bed to trailing position, just pull bed forward over the wheels.

The axle is held in alignment with the frame by a track running through the center of the frame. Steel plate reinforces the outer end of the planking and makes a smoother surface for the wheels to roll on. The trailer has a specially designed pintle type hitch that does not interfere with the conventional ball hitch used on lighter trailers. The axle shifts quickly and easily, loaded or empty.

For more information circle 126 on Service Coupon Page 14 and mail now.

Nozzle for Sandblast Machine Cuts Costs

New Clemco venturi nozzles for sandblast machines, announced by Clemtine, Ltd., 2277 Jerrold Ave., San Francisco, Calif., are claimed to have cut operating costs 20 to 40% by higher square foot blasting per hour. Nozzles will fit all sandblast units now in use.

The venturi design is stated to produce higher impact and a larger pattern. Uniform impact, without the large fringe areas, permits the blaster to clean a surface faster and cleaner.

Available in short lengths for close work or in longer lengths for hard to clean surfaces. All orifices sizes from 3/16 in. to 3/4 in. The tungsten carbide lining insures long life.

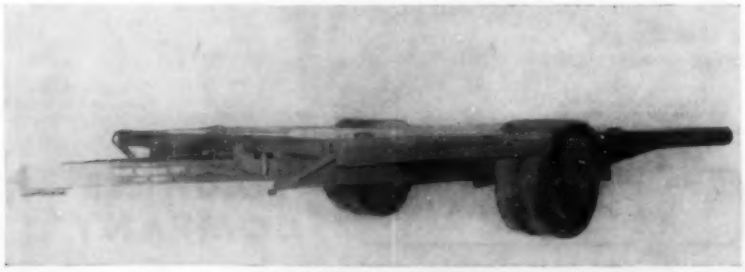
For more information circle 127 on Service Coupon Page 14 and mail now.

Electrode for Hard-Facing Heavy Duty Equipment

Development of the new Mir-O-Col 4T-S hard facing electrode has been announced by Mir-O-Col Alloy Co., Inc. Mir-O-Col 4T-S is especially recommended on tractor track rails, grousers, and all around general build-up of worn tractor rails. Mir-O-Col 4T-S is a medium alloy, highly deductile rod that will not chip or spall from the base metal. Recommended application is by electric AC-DC.

Descriptive literature, price list and samples of Mir-O-Col 4T-S are available from Mir-O-Col Alloy Co., 312 North Ave., 21, Los Angeles 31, Calif.

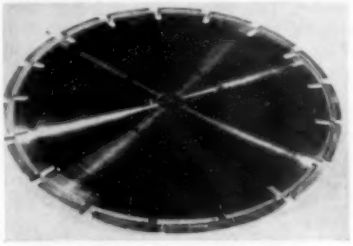
For more information circle 128 on Service Coupon Page 14 and mail now.



Buhl Machinery Trailer

Diamond Blade Has New Design Features

A new diamond blade, the DM190, for sawing joints in green or cured concrete, developed by The Carborundum Co., Niagara Falls, N.Y. is bonded with tungsten carbide.



DM190 Diamond Blade

The new blade is stated to have cut at rates up to 10 ft. per minute at a depth of 2 in., depending on the type of aggregate used in the mix.

Performance of the DM190 is stated to be due to an improvement in the design of the diamond segments (Patent pending) mounted on the periphery of the steel center. Designing the diamond segment so that a lip of wear resistant tungsten carbide overlaps the leading edge of the land is stated to reduce the wear to a point where it no longer influences the life of the blade.

Wear resistant characteristics of the new diamond segment are stated to be such that the rate of thickness loss is greatly reduced. This feature is stated to allow the blade to be used until the full depth of the diamond segment is consumed.

For more information circle 129 on Service Coupon Page 14 and mail now.

Dolly for Portable Electric Plants

A 2-wheel dolly, the PD100, for use with its line of portable electric plants, has been introduced by Multi-Matic Corporation, 14741 Besemer St., Van Nuys, Calif.



Multi-Matic's PD-100 Dolly

Made of lightweight welded steel tubing (this dolly weighs just 15 lb.), the PD100 is easily carried on a light pick-up truck or in the trunk of a car and

provides easy transference of the Gen-A-Matic to wherever it is needed.

The heavy duty, industrial-type wheels on the PD100 are large size for easy rollability and have semi-pneumatic tires and anti-friction bearings. There is provision on the stand for carrying 100 ft. of cord.

For more information circle 130 on Service Coupon Page 14 and mail now.

Turbocharged Rubber-Tired 165 HP Dozer

The first rubber-tired dozer powered by turbocharged diesel engine has been introduced by the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich. Named the Michigan Model 180 Turbo-Dozer, the machine has a 165 HP rating and a capacity of 2-3/4 yd. It has a road speed of 27 miles per hour, and has four-wheel and rear-wheel steering which permits full power on wheels even while turning.



Model 180 Turbo-Dozer

Among operational advantages claimed by the manufacturer are hydraulic controls which facilitate easier maintenance, a bowl which can be tilted by the operator while the machine is in motion and the ability to move under its own power over the highways. Like the Michigan tractor shovel line built by Clark, the Turbo-Dozer features a power-shift transmission, a heavy duty torque converter which automatically provides up to 3 to 1 torque multiplication and planetary wheel drive axles.

For more information circle 131 on Service Coupon Page 14 and mail now.

Bituminous Mixer

Model "400" Trail-O-Patcher, an all weather bituminous mixer, announced by Littleford Bros. Inc., 454 E. Pearl St., Cincinnati 2, O. is engineered to produce at low cost a full range of hot and cold mixes. Ease of operation and simplicity of maintenance were prime design considerations.



Model "400" Trail-O-Patcher

Model "400" Trail-O-Patcher has a 4 cu. ft. capacity hopper. It's construction makes it a simple task to fill the aggregate hopper directly from the rear of a truck. A quick acting gate permits the aggregate to dump into the twin pugmills. Model "400" is equipped with an attachment whereby bitumen can be added to the aggregate in the aggregate hopper. Each half of the twin pugmill is 24 in. in diameter x 28 in. long. Replaceable ¾ in. abrasion resisting hardened steel liner plates protect the pugmill wearing surfaces. Two 6-K Littleford torch type burners provide the heat for drying and mixing. Each burner provides 2200° F. and fire directly into the pugmill.

Pugmill paddles are powered by Wisconsin 7 HP 200 rpm air cooled engines. All operating controls on the Model "400" are conveniently grouped and accessible. Model "400" Trail-O-Patcher has a discharge pan that will hold 4 cu. ft. of material without spilling and can be adjusted to any position or can be removed. Model "400" is mounted on a single axle pneumatic tire trailer making it highly portable.

Model "400" Trail-O-Patcher can be trailed behind a maintenance truck to many jobs in a single day or used in a yard to produce bituminous materials as needed.

For more information circle 132 on Service Coupon Page 14 and mail now.

BUY BARNES PUMPS

FOR SPRING THAW AND RAIN DEWATERING
BARNES SELF-PRIMING CENTRIFUGALS GIVE YOU

MORE PUMP • MORE PROFIT • THREE WAYS



1 Barnes 33,000 for 1 Pumps — 33,000 gallons of water pumped for 1 gallon of gasoline consumed — give you economy unmatched in the Pump field!

2 Barnes exclusive self-priming principle — quick, dependable priming with as little as ⅓ normal water level in Pump body — gives you field performance second to none!

3 Barnes direct flow suction — no water detours from suction inlet to impeller eye — Barnes advanced type non-clogging, trash type impeller, and Barnes self-lubricating Super-seal make field servicing easy, quick, and economical!

BUY BARNES FOR GREATEST PUMP VALUE

SEE YOUR BARNES DEALER TODAY OR WRITE FOR CATALOG R2

Barnes MANUFACTURING CO. MANSFIELD, OHIO

BARNES MANUFACTURING CO.
Mansfield, Ohio Oakland 21, Calif.
BUY THE BEST....BUY BARNES!

... for more details circle 183, page 14

NEW Powerhouse on wheels!

Trailer-mounted ONAN "CW" Electric Plant

5 or 10KW



Here's real mobility in high-capacity electric plants. You can tow a trailer-mounted Onan "CW" as fast as a car will travel . . . anywhere a tractor can go. Fully-protected by heavy-gauge steel housing; stays on the job in any weather.

Onan "CW" Electric Plants are unusually compact, quiet-running and economical to operate; weigh only half as much as water-cooled plants of the same capacity. Powered by Onan two-cylinder, suction-air-cooled gasoline engines built with massive, long-wearing parts for continuous, heavy-duty service.

WIDE RANGE OF ACCESSORIES

You can equip your "CW" Electric Plant for any type of portable service. Accessories include skid, battery rack, 9-gallon fuel tank, weather-proof housing, two-wheel trailer, or 4-wheel rubber-tired dolly. *Put one of these portable, high-capacity units on your job now!*

Write for Folder A-362

Onan ELECTRIC PLANTS

D. W. ONAN & SONS, INC.

3453 Univ. Ave. S. E., Minneapolis 14, Minn.

. . . for more details circle 234, page 14

NOW! Curb and gutter work can be profitable

ASK * ANY USER



With A DOTMAR CURB GUTTER and SIDEWALK PAVER

With NEW Mechanical Tamping Attachment, which eliminates one man, assures more uniform structure and enables paver to run at faster speeds, the Dotmar Curb, Gutter and Sidewalk Paver is more than ever a true profit-maker. Pays for itself the first mile of paving. Is available with trowel for all standard curb and for integral gutter, curb and sidewalks, or sidewalks alone, up to 6' wide. Also highway widening and median strip. Ends paving bottlenecks, economical to own and operate! Ask for Bulletin 53! *Users' names on request.



DOTMAR AirAce Hammer

Easy to hold as a pistol — powerful as a cannon. Weighs only 3½ lbs. 7" long. For boring holes in concrete, cutting sheet metal, riveting, hammering, caulking. Requires only 1 h.p. air compressor, air pressure as low as 40 lbs. Economical operation. Send for Bulletin 154.

Dotmar INDUSTRIES Inc.

501 Hanselman Bldg. Kalamazoo, Mich.

. . . for more details circle 199, page 14

Smokeless Salamander Has Double Burning Action

A smokeless type of Salamander stated to burn less than a gallon of oil per hour and to produce 175,000 BTU has been



Smokeless Salamander

perfected by C. R. Daniels, Inc., Daniels, Md. The principal feature is a special design circulator which drives the heat streams "in tandem." Unburned material and partially consumed gases rise up and out of the top of the circulator, then are down-drafted back and up again through the flames. Smoke, soot, fumes, gases and unburned material are forced through the fire and every possible BTU is literally "squeezed out of them." The result is stated to be complete heat from every ounce of oil, resulting in a high operating efficiency and a low cost per hour. Smoke is eliminated because it is consumed in the heart of the heat core.

For more information circle 133 on Service Coupon Page 14 and mail now.

Flasher Sign

Neo-Flasher Manufacturing Co., 3210 Valhalla Drive, Burbank, Calif., formerly known as Light Products, Inc., has announced the introduction of Neo-Flasher Model O-100, a dual head light with concentric fresnel lens which throws brilliant wide beams in two directions. The sturdy steel housing protects the light from damage.

One outstanding feature of this unit is that the light can be serviced "on the job level" without removing the light from the barricade, making servicing and maintenance an easy task. It is complete-

ly weatherproof, neither wind nor rain can put it out. It is equipped with a tamper-proof switch and is securely held to the barricade by use of a special device to prevent theft or vandalism (no locks used.) It is stated that one small six-volt battery will operate continuously for 1,000 hours. The all Scotchlite panel of the Neo-Flasher Barricade is many times brighter than ordinary yellow paint and will illuminate brilliantly by approaching headlights. The galvanized pipe section and hip casting are cadmium plated. Dimensions are: 42½ in. long x 44 in. high x 34 in. leg span and the panel is 13 in. high x 40 in. long. The weight is 56 lb. complete.

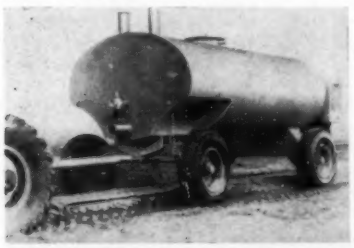


Neo-Flasher Model 0-100

For more information circle 134 on Service Coupon Page 14 and mail now.

Tank Trailer

The new Model 2500 portable tank trailer, announced by Pettibone Wood Mfg. Co., Box 620, 6900 Tunga Ave., North Hollywood, Calif., is designed for use with Pettibone Wood roadmixers (or other traveling mixing plants) to carry road oil, emulsions and other binder fluids. It is built of heavy steel plate, welded construction, mounted on rigid frames. The pneumatic tires and perfect balance make it easy to tow behind a roadmix unit. The Model 2500 is available with pump unit insulation and flues and burners. Insulated models with heating flues and burners eliminate the returning of oil in cases of temporary job shutdowns as oil can be kept or brought up to the desired temperature.

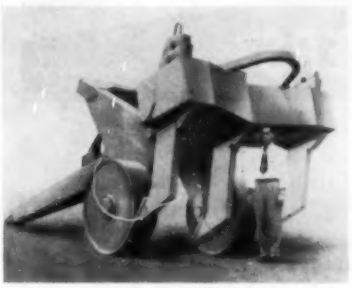


Model 2500 Portable Tank Trailer

For more information circle 135 on Service Coupon Page 14 and mail now.

Ripper Weighs 25,000 Lb.

A new giant ripper, Model RXH-3, introduced by Southwest Welding and Manufacturing Co., 3201 West Mission Road, Alhambra, Calif., is claimed to have special application in big earth moving jobs as well as for breaking up heavy overburden and mining ores. It is stated to rip deeper and faster than lightweight equipment. The complete unit, weighing 25,000 lb., is built to work with new large, high powered track-type tractors. Depth control provides for ripping at depths of 36 in., 42 in. and 48 in. A special long-center standard is available to give an extreme penetration of 60 in. The machine is cable controlled. The heavy standards of special alloy heat-treated steel have removable hard-faced points for maximum resistance to wear.



Model RXH-3 Ripper

For more information circle 136 on Service Coupon Page 14 and mail now.

Grouser Shoes

Improved traction, greater safety and longer wear are claimed for the new Pacific Chevron grouser shoes now being offered by Alloy Steel & Metals Co., 1848 E. 55th St., Los Angeles 58, Calif.

Due to its chevron shape, the grouser is approximately 1 in. longer than the conventional type. This means that a 20 in. shoe has approximately a 22 in. grouser. In addition, the chevron shape offers a three-point stable contact. This is stated to mean smoother tractor travel on firm surfaces with less wear in the rail hinge points and less racking of the whole tractor. Pacific Chevron grouser shoes are made of manganese molybdenum steel, heat-treated to develop an optimum balance of strength, toughness. The grouser is higher and thicker to provide longer wear. Bolt holes are jig drilled to close tolerances and assure easy assembly and added assurance that bolts will remain tight during operation.



Pacific Chevron Grouser Shoe

For more information circle 137 on Service Coupon Page 14 and mail now.

Vermette Power Drive Added to Toledo Line

The Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo, Ohio, has announced a new addition to its line of



Toledo No. 78 Vermette Power Drive

pipe tools and machines — the Toledo No. 78 Vermette power drive which is already well-known in the industry under the Vermette name. This power drive features extra heavy-duty construction combined with compactness and light weight. The complete unit with folding tripod legs weighs only 75 lb., and it can be carried and operated by one man.

The Toledo No. 78 power drive can be used for all cutting, reaming, threading, and fitting operations. The chuck takes only a few seconds to set up; handles 1/4 in. to 2 in. pipe and conduit; chuck grips, tightens and centers pipe automatically in forward or reverse; screws fittings on tighter than possible by hand.

For more information circle 138 on Service Coupon Page 14 and mail now.

Light Weight Masonry Saw

The "Tak-A-Bout" masonry saw, a recent development of the Champion Manufacturing Co., 2028 Washington Ave., St. Louis 3, Mo., is claimed to be 40% lighter in weight than the regular saw models. Made of tubular steel and aluminum, the Tak-A-Bout maintains the simplicity of design and structural strength of the standard masonry saw, yet it allows easy and rapid moving about the job by one man. This portable saw model is available in wet or dry cutting specifications, and the maker also supplies retractable wheels, which are easily attached to the rear cross-member of the saw frame, as an accessory. Another important feature added to the Tak-A-Bout saw is Champion's exclusive 110V-220V selector switch. This switch allows use of the saw on any job where power is available without rewiring of the motor.

For more information circle 139 on Service Coupon Page 14 and mail now.

one skyscraper coming up



ON

ROGERS TRAILERS

Bigley Bros. Inc. of New York City have earned a reputation as specialists in steel girder transportation.

Among several interesting jobs were the hauling of all the steel for the United Nations Building, the New York City Post Office and New Jersey Turnpike Bridges.

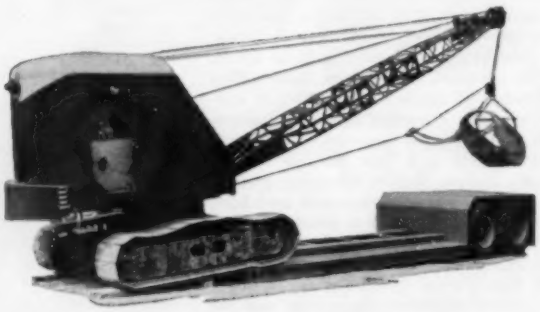
Typical of girders hauled up to 110 feet long weighing as much as 95 tons is this girder for the New York Through Way. The front end is mounted on a 75 ton Rogers Low Bed Trailer with the rear on a 35 ton Rogers Pole Trailer.

The confidence displayed in Rogers Trailers by outstanding contractors and riggers suggests that you should thoroughly investigate this complete line before purchasing any such equipment.

EXPERIENCE builds 'em

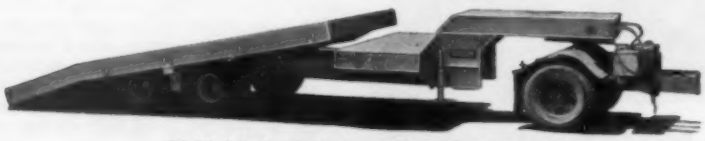
ROGERS HEAVY DUTY Gooseneck Trailers

PERFORMANCE sells 'em



ROGERS BROS. CORP. ALBION, PENNA. 110 Orchard Street

Export Office: 50 Church St., New York 7, N.Y., U.S.A. — Cable Address: Brosites



Divided bed, tilt deck trailer with gooseneck.

. . . for more details circle 240, page 14

Tractor Shovel

A new super Speedall line of tractor-shovels, announced by Pettibone Mulliken Corporation, 4700 W. Division St., Chicago, Ill., features an extra heavy-duty power train including power-shift transmission, torque converter and four-wheel drive planetary axles. The line has a 2-1/2 cu. yd. unit. In addition, 1-1/4 and 1-3/4 yd. models are available. The line supplements Pettibone's standard 4-wheel drive Speedall units with torque converter.



New Speedall Tractor Shovel

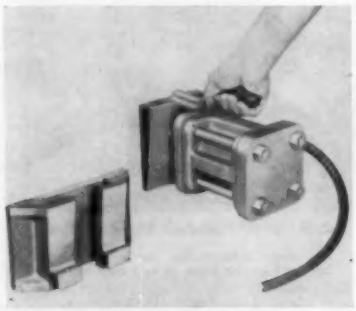
An outstanding feature of the machine is construction of the power-shift transmission, which has been tested extensively since 1948 and incorporates three patented design principles. Cased in steel, the transmission is designed with ball bearings throughout, high-pressure forced lubrication, and larger helical gears.

The clutch pedal has been eliminated, and two simple levers on the steering column hydraulically shift the tractor-shovel four speeds forward or four speeds reverse, permitting simple operation with less operator fatigue.

For more information circle 140 on Service Coupon Page 14 and mail now.

Lightweight Portable Vibrator

A new lightweight, portable vibrator, Type LSRRH, has been announced by The Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland, O. This well balanced vibrator is claimed to be ideal for heavy duty use on portable bins, trucks, concrete forms, septic tanks and large pipe forms that do not require permanent vibrator installation. It develops 7000 to 8000 vibrations per minute at maximum efficiency. This new vibrator is available with sturdy cast steel bracket for easy attachment.

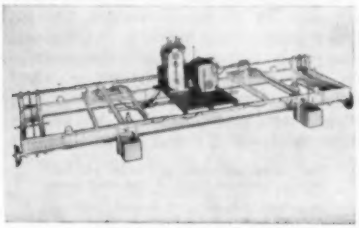


Type LSRRH Portable Vibrator

For more information circle 141 on Service Coupon Page 14 and mail now.

Curing Machine

A curing machine, featuring top travel and working speeds, has been placed on the market by General Road Machines, Inc., Niles, O. Of extra heavy channel frame construction it employs two spray nozzles fixed to double sweeping arms, thus assuring a fine dual spray pattern in



GRM Curing Machine

strict accordance with specifications. Telescopic construction allows width adjustments from 10 ft. to 25 ft. The spray nozzles are enclosed with wind shields so that a consistent spray pattern can be maintained.

For more information circle 142 on Service Coupon Page 14 and mail now.

Pump Has Special Features

A line of light-weight, all-aluminum centrifugal self-priming pumps is being introduced by Multi-Matic Corporation, 14741 Bessemer St., Van Nuys, Calif.

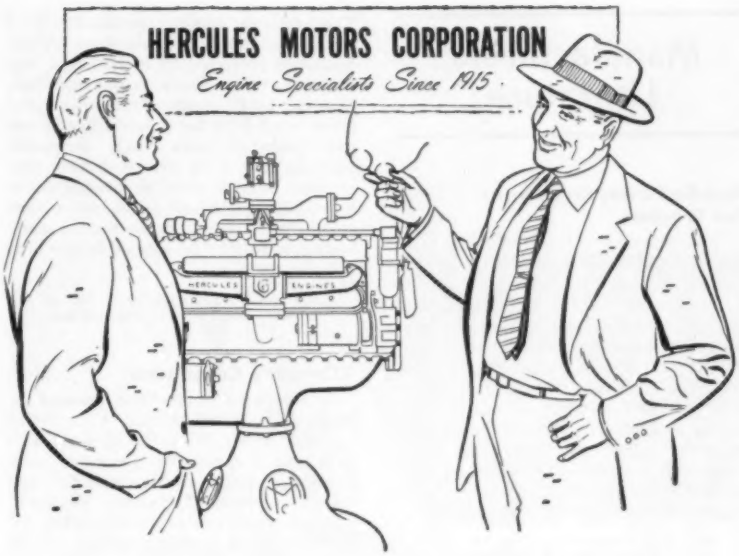
Pumps are being offered in four models — a 1½ in. model that pumps 6,000 gal. per hour; a 2-in. pump that delivers 8,000 gph and a 2-in. pump, with a larger impeller and greater engine power that has a capacity of 12,000 gph; and a 3-in. pump with 22,000 gph.

The Gen-A-Matic centrifugal pumps have several special features including a unique wearplate assembly, held by bolts, that is easily replaced from the front, effecting valuable savings in layup time when the wearplate is replaced. A spring-loaded mechanical seal binds the specially designed "swirlpool" impeller, so that leakage is eliminated and the impeller requires little or no maintenance throughout a lifetime of normal use.



Gen-A-Matic Centrifugal Self-Priming Pump

For more information circle 143 on Service Coupon Page 14 and mail now.



It May Cost a Little More to Buy the Best

But **HERCULES ENGINES give you** *So Much More* **for your money.**

● (1) Long-life service . . . not just an idle statement. Many HERCULES ENGINES 5, 10, and 15 years old are still delivering dependable day-in, day-out power. (2) Engines designed to-the-application . . . granted, we have over 90 standard models but they are not off-the-shelf items. HERCULES ENGINES are custom-produced to specifications of the equipment. (3) Gasoline or Diesel . . . many models of gasoline engines have similar mounting dimensions as diesel engines of like displacement. (4) Wide selection of fuels . . . HERCULES ENGINES operate efficiently on any popular fuel available, permitting the use of the most economical fuel in your area . . . gasoline, diesel fuel, natural gas, kerosene, L.P.G. and others. (5) Lightweight, heavy-duty construction . . . the excess metal that adds to engine weight has been eliminated . . . all 6 cyl. engines have 7 bearing Tocco hardened crankshafts, large precision-type bearings and full length water jackets are some of the extras which are standard on HERCULES ENGINES.

These are but a few of the features that make HERCULES ENGINES a better buy. For more complete information on the wide selection of Hercules Engines and Power Units, write for a copy of the folder, "Hercules Engines." This lists the many sizes of engines and their power ratings.

HERCULES ENGINES

HERCULES MOTORS CORPORATION

40 Years of Engines for Industry

107 Eleventh Street, S. E. • Canton, Ohio

. . . for more details circle 215, page 14

Manufacturers' Literature

Mobile Power Generator For Tractors

"Electricity on Wheels" is the title of a new publication available from the General Electric Co., Schenectady 5, N. Y. Designated GEA-6400, the 12-page bulletin describes GE's new mobile-power generator for tractors, outlines operation, and lists its range of uses. The new generator, according to the bulletin is the result of six years of extensive research, development and testing. Included in the bulletin are illustrations showing use of the mobile generator in such applications as floodlighting, power sawing, welding and electric spraying.

For more information circle 144 on Service Coupon Page 14 and mail now.

Highway Striping

Catalog W-10, available from Wald Industries, Huntingdon, Penna., illustrates and describes how their Truck-O-Liner, a truck-towed trailer, is used in striping highways. The entire procedure is simplified for speed and economy. While the truck driver guides on the layout dots by means of a pointer, a second man on the Truck-O-Liner trailer operates the spray guns. The freshly painted lines are immediately protected by a third man who drops Wald Zee-Cards on the new lines. Material tanks, engine, compressor and other heavy parts are grouped in convenient, packaged units easily removable from the rear of the tow truck. One, two, or three lines — solid or intermittent or a combination of both — in one or more colors of reflective or non-reflective marking materials may be applied in one integrated operation.

For more information circle 145 on Service Coupon Page 14 and mail now.

Vibratory Compactor

A new 4-page brochure released by Roadequip Manufacturing Co., 30210 Lakeland Blvd., Wickliffe, O. deals with its vibratory compactor for rapid compaction of single course macadam and gravel sub-bases. Brochure illustrates many features: rubber tired mobility, efficient vertical tamping action, 13 ft. width, and forward or backward operation. Job applications on various road-building materials are also shown.

For more information circle 146 on Service Coupon Page 14 and mail now.

Non-Destructive Testing Of Concrete

How the Schmidt concrete test hammer is used for the rapid, easy determination of concrete compression strength is described in a 4-page circular available from Arthur R. Anderson, 517 North Eye St., Tacoma 3, Wash. Applications of the hammer include: as an adjunct to cylinder tests for testing uniformity of concrete quality throughout a concrete structure; by determining the surface hardness of the concrete, it measures the resistance of the concrete to erosion and abrasion; by on-the-job testing, the actual strength of the concrete in the structure can be determined; aids the contractor and engineer to determine when shoes and forms may be removed; tells when winter-placed concrete will be safe from sub-freezing temperatures.

For more information circle 147 on Service Coupon Page 14 and mail now.

Motor Grader

A new highly-illustrated 16-page catalog (No. 380) on its Model 503 motor grader is available from The Galion Iron Works & Mfg. Co., Galion, Ohio, U.S.A. The numerous construction and operating features of this machine are completely described. The many big grader type attachments are also fully described. This optional equipment includes hydraulic shiftable moldboard, front-end scarifier, leaning front wheels, hydraulic circle turn, rear-end bucket loader, windrow eliminator, "V" and straight snow plows, and bulldozer.

For more inofrmation circle 148 on Service Coupon Page 14 and mail now.



The Roll-Over is a high speed, high capacity plow designed for use on airports, dual highways or open areas to move snow either to the right or left as wind direction and terrain may require.

This unique plow, made only by Frink, can be hydraulically reversed to deliver snow to either side by rotating the moldboard, thus it has the advantage of being able to discharge to the left and yet travel *with* the flow of traffic.

The Frink Roll-Over Sno-Plow combines all the desirable one-way features of good visibility, high speed, throwing and spreading ability with the versatility of a reversible plow.

By slight modification to the Frink lifting device assembly this plow may be used interchangeably on suitable sized trucks equipped for the Frink V-Type, One-Way Type or Reversible Blade Type Sno-Plows.

For further information on this Sno-Plow write for catalog to Clayton, N. Y., Box RS 559

FRINK SNO-PLOWS

FRINK SNO-PLOWS, INC., CLAYTON, NEW YORK

Made in Canada by

FRINK SNO-PLOWS of CANADA, LTD., TORONTO, ONT.

. . . for more details circle 204, page 14

Drainage Structures

A new publication from Armco Drainage & Metal Products, Inc., tells how proper drainage structures stop trouble before it starts. Such structures have flexible strength to withstand live loads . . . . flexible strength to withstand dead loads . . . . strong joints to withstand transverse pressures and soil movement . . . . beam strength to resist soft spots in the foundation . . . . all-metal construction to absorb frost action . . . . long lengths and strong, tight joints to prevent progressive undermining. Typical installations are shown. Write to the company's Product Information Service, Middletown, O., and ask for Folder CMS 9555.

For more information circle 149 on Service Coupon Page 14 and mail now.

Heavy-Duty Vertical Auger Drills

New McCarthy vertical drill model 106-24 for strip mine operation, highway construction, soil engineering and general exploration is described in new 4-page Bulletin M-100, published by The Salem Tool Co., S. Ellsworth Ave., Salem, O. The new drill handles augers 6 ft. long up to 24 in. diameter. An auxiliary speed reducing unit built integral with the traveling carriage reduces rotary speed and increases torque for large diameter augers. Two output shafts turn at separate speeds, normal speed for augers up to 8 in. and slow speed suitable for 12 in. diameter augers. Field installation pictures and specifications are included for the new drill and the McCarthy vertical model 106-8 for augers up to 8 in.

For more information circle 150 on Service Coupon Page 14 and mail now.

Maintainer

A new 12-page bulletin (HWM-512) on its Model M-52 maintainer, announced by Huber-Warco Co., Marion, O. features color photos of the maintainer in action and lists comprehensive specifications on both the maintainer and its power units. Photos are used to point out features of the frame, power unit, easy to reach controls, power sliding moldboard, torque converter and optional equipment such as the cab, scarifier, and canopy top. Each of the maintainer's nine hydraulically controlled attachments is described in detail with photos, specifications, and basic information on its uses and features. The attachments are the lift-loader, backfilling blade, bulldozer, broom, side dozer, patch roller, highway mower, snow plow, and berm leveler.

For more information circle 151 on Service Coupon Page 14 and mail now.

Drafting Equipment

A new 32-page, colorful, illustrated catalog featuring its line of drafting equipment has been released by Frederick Post Co., 3650 N. Avondale Ave., Chicago 18, Ill. Covered in the catalog are drafting machines, drawing boards, T-squares, parallel rules, triangles, templates, curves and lettering aids.

For more information circle 152 on Service Coupon this page and mail now.



Crail Bros. Co., Long Beach, California, using a Moto-Crane with **two Waukesha Engines**—(powering the boom) a **140-GK Gasoline,** six-cyl., 4½-in. x 5½-in., 525 cu. in., 160 max. hp. at 2250 rpm; and (powering the chassis) a **145-GKB Gasoline,** six-cyl., 5¼-in. x 6-in., 779 cu. in., 240 max. hp. at 2400 rpm. Being spotted is a 22-ton Gardner-Denver mud pump with **two WAKU Waukesha** LP or natural gas units, six-cyl., 6¼-in. x 6½-in., 1197 cu. in.; each 213 continuous hp. at 1300 rpm.

EVERYWHERE in the industrial picture

WAUKESHA ENGINES

Multi-Unit Waukesha Horsepower—this MC-524 Lorain has it! So does this Gardner-Denver mud pump that's being spotted in the Long Beach outer harbor area. Two Waukeshas give the Moto-Crane safe, sure, steady power, with a ready reserve for heavy handling. Fast, flexible power, too, for speedy movability and reliable road travel. And the mud pump with its Waukeshas is powered to remove about 700 gal. of heavy oil mud per minute in oil well deep drilling jobs. Send for Bulletins.

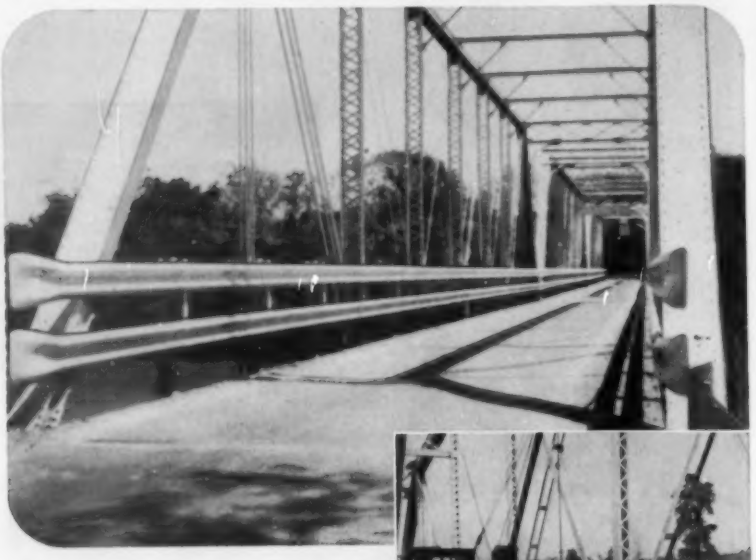
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WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.

NEW YORK • TULSA • LOS ANGELES

. . . for more details circle 255, page 14

Low-Cost "team" reduces Bridge Reconstruction costs!



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BRIDGE FLOORING
AND
TRAFFIC RAIL

Two big items in bridge reconstruction—new floors and traffic rails—are effectively and economically supplied with this tried and proved "team."

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WOOSTER, OHIO

Structural-Plate Bridge Flooring • Barrier-Beam Highway Guard Rail • Corrugated Metal Drainage Products • Prefabricated Steel Buildings • Steel Doors and Frames

. . . for more details circle 254, page 14

Welding Equipment

A new 16-page catalog, announced by Air Reduction Sales Co., 60 East 42nd St., New York 17, N.Y. features Airco-Matic (Airco's inert-gas-shielded metal arc welding process) welding equipment. Manual and automatic units along with accessory apparatus and welding wire are included in the illustrated booklet.

For more information circle 153 on Service Coupon Page 14 and mail now.

Crawler Tractor Powered By Two Engines

The new Euclid TC-12 twin crawler tractor, powered by two 194 HP diesels, is described in a 4-page, 4-color catalog (Form No. 601) released by Euclid Division of General Motors Corporation, Cleveland 17, O. This catalog describes the revolutionary design of this tractor with its two engines and separate torq-matic drives for each track that give it a total of 365 HP delivered to the power train. Other unusual features illustrated are rear radiator mountings, separate and independent track drives, and hydraulic track tension.

For more information circle 154 on Service Coupon Page 14 and mail now.

Concrete Testing Equipment

Three new bulletins on its equipment for testing concrete have been issued by Forney's Incorporated, 209 Elm St., New Castle, Penna. One bulletin covers Model QC-200, a 200 ton tester for concrete blocks and cylinders. Another covers the Model QC-100-S compression and flexture testing machines, and the third bulletin covers Model LT-500 compression and flexture testing machine. The machines are illustrated and complete descriptions given.

For more information circle 155 on Service Coupon Page 14 and mail now.

Concrete Vibrators

"Stories of Effective Vibration" is the title of an 8-page bulletin issued by Viber Co., 726 South Flower St., Burbank, Calif. It contains descriptions and illustrations of how vibration was employed in the construction of a monolithic prestressed concrete office building, in the construction of precast shells for bridge piers, in the construction of lightweight panels and beams, in the construction of concrete pipe, and in the construction of a 15,000 ft., 19 in. thick runway.

For more information circle 156 on Service Coupon Page 14 and mail now.

Construction Machine Cabs

Construction machine cabs are pictured in two illustration sheets issued by Crenlo, Inc., Rochester, Minn. Illustrated in the sheets is the Crenlo Model 1105 AM winterized enclosure and tailored cabs for Caterpillar, John Deere and International Harvester tractors, Allis-Chalmers four wheel prime movers and a Whiting trackmobile. For additional information or copies of the literature, write Dept. KP, Crenlo, Inc., Rochester, Minn.

For more information circle 157 on Service Coupon Page 14 and mail now.

Convertible Level

New 4-page folder on its new convertible level is available from Dept. F, Warren-Knight Co., 136 N. 12 St., Philadelphia 7, Penna. The instrument is illustrated and various important features are described. Specifications are included. This level features a complete new design that offers sturdier construction, longer life, and unusual ease of adjustment.

For more information cricle 158 on Service Coupon Page 14 and mail now.

195 HP Grader

A new 12-page bulletin (HWG-508) on its new 5D-190, 195HP grader, announced by Huber-Warco Co., Marion, O. features action photographs of the grader. With cross-sections, diagrams and photos the bulletin points out features of the grader's high-arched frame, front axle, circle and drawbar, fully enclosed tandem case, hydraulic booster steering, easy to reach controls, four-wheel brakes, high axle clearance, power sliding moldboard, torque converter, retractable scarifier, power unit, and final drive. A special section illustrates the machine's completely cab-controlled 90-degree blade movement together with a discussion of the unit's saddle which makes it possible.

For more information circle 159 on Service Coupon Page 14 and mail now.

20,000 Lb. Capacity Straddle Dump Carrier

Performance characteristics, construction details and engineering specifications of its new straddle dump carrier are contained in a 4-page brochure, available from Ross Carrier Division, Clark Equipment Co., Benton Harbor, Michigan, U. S.A. Described is the hydraulically operated dumping device for use with the 20,000 lb. capacity Ross straddle carrier. Through its use box-like containers for gravel, scrap, coal, sand and other bulk materials can be picked up, transported any distance and dumped in a one-man operation. Container specifications are given so that users may build them locally. Container capacities range from 7 to 20 cu. yd.

For more information circle 160 on Service Coupon Page 14 and mail now.

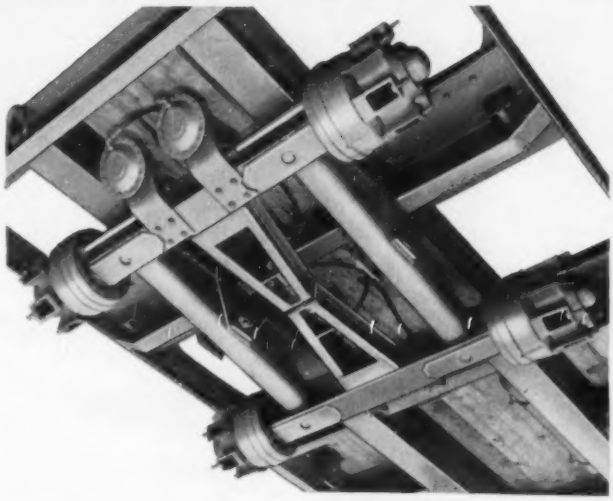
How Zinc Controls Corrosion

"How Zinc Controls Corrosion," a new 32-page illustrated booklet has been published by the American Zinc Institute, 60 East 42nd St., New York 17, N.Y.

The book describes the many ways zinc lengthens the life of steel products, and reduces maintenance costs. Drawings, charts, and photographs together with brief comments present the corrosion control characteristics of zinc coatings, zinc pigments, and zinc anodes. An extensive selection of farm, industrial, marine and building applications of zinc is reviewed.

For more information circle 161 on Service Coupon Page 14 and mail now.

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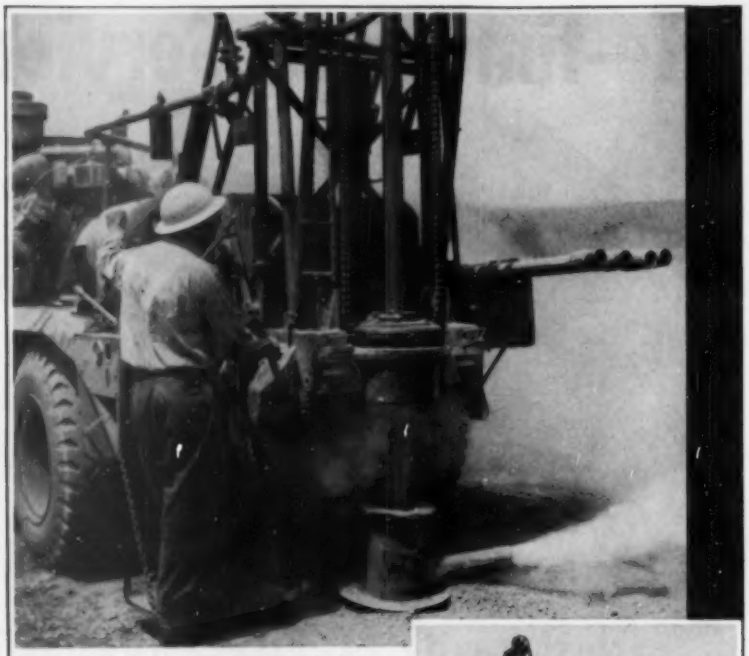
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LaCROSSE LC-35
AMERICA'S FAVORITE LOW BED TRAILER

. . . for more details circle 223, page 14



Davey Rotary Drill on James E. Heffman job near Karthaus, Pa.



cut drilling costs on every construction job!

DAVEY

Rotary Drills

On every big construction job, you can speed drilling . . . cut the costs of blast holes, structure testing, core drilling—with Daveys!

Davey Rotary Drills are suitable for mounting on any truck . . . move fast between jobs . . . are easy to set in drilling position. They are available in 6 different models—air blast, mud pump, or combination types. Rated capacities to 2,000 ft. Features include choice of power take-off or separate power unit operation, automatic hydraulic feed, hydraulic pull down, heavy-duty rotary table, rugged tubular box-type mast.

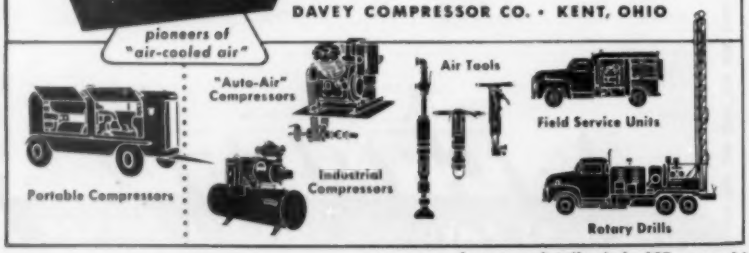
AA-1700

Write for full details!

DAVEY

pioneers of "air-cooled air"

DAVEY COMPRESSOR CO. • KENT, OHIO



. . . for more details circle 197, page 14

Form Engineering

A new catalog, No. 1955, issued by Williams Form Engineering Corporation, 1501 Madison Ave. S.E., Grand Rapids 7, Mich., shows the latest engineered products and proven methods of concrete forming devices for both light and heavy construction. It is a most comprehensive catalog on form engineering. Included in it are suggested specifications and hints for better concrete construction, suggestions for using Williams form clamps and other accessories, charts for loads against retaining walls, tables for the most economical designing of forms, suggested method of tying side wall forms, and suggested method of tying bridge decking.

For more information circle 162 on Service Coupon Page 14 and mail now.

Dual Compression Trench Roller

A new bulletin, Number 2497, issued by Blaw-Knox Co., Farmers Bank Building, Pittsburgh, Pa. describes the DTR-552 dual compression trench roller, newest addition to the Blaw-Knox package line of road building equipment. One of the unique features of the trench roller, which is described in the bulletin along with general specifications, is that the rolls can be adjusted for wide or narrow strip compaction while the machine is in motion.

For more information circle 163 on Service Coupon Page 14 and mail now.

Bituminous Concrete and Aggregate Spreader

A 4-page circular issued by The Miller Spreader Corporation, 120 Pike St., Youngstown, O. contains illustrations and descriptive matter on its bituminous concrete and aggregate spreader. Specifications are given. This spreader can be used with any conventional dump truck that has been fitted with a simple clamp-on hitch on the rear axle housing. An outstanding feature of the spreader is that regardless of the contour of the base surface, the screed moves forward on an even plane, leaving a smooth level surface ready for rolling. On reaching the end of the pass, the tail gate is latched, the lifting links are attached to the hooks on the tail gate, the body is lowered, and the spreader is then ready to be moved to the next job, or to any other place desired.

For more information circle 164 on Service Coupon Page 14 and mail now.

All-Drive Wheel Tractor

The Garrett Model 60, rubber-tired, 4-wheel drive, 30 DB HP class tractor is illustrated and described in a 4-page circular issued by Garrett Distributors, 800 Stevenson Ave., Enumclaw, Wash. This tractor is claimed to have the traction, pulling power and all around usefulness of a crawler tractor because of its unique 4-wheel drive. On the job illustrations of the tractor are shown and specifications are included.

For more information circle 165 on Service Coupon Page 14 and mail now.

Bituminous ROADS AND STREETS



Published by Gillette Publishing Company
22 West Maple Street, Chicago 10, Illinois

Applying heavy spraybar gallonage for penetration macadam base, for shoulders along the newly widened Garden State Parkway (See article in this issue).

How to Build a Bituminous Shoulder — 2 Miles a Day
Emulsified Asphalt Solves County Road Problems
Special Device Aids Fabric-in-Asphalt Placement

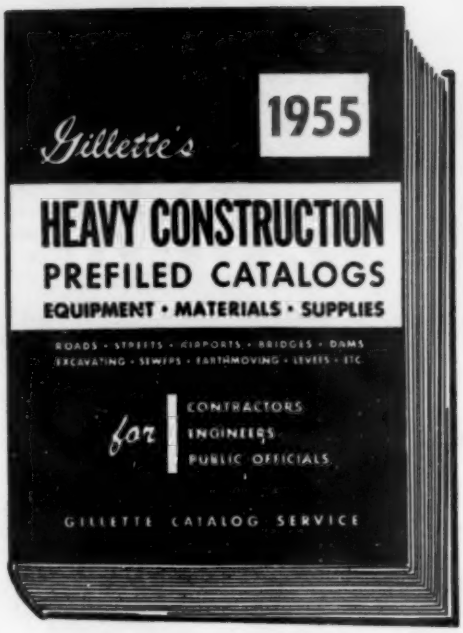
SEPTEMBER 1955

here . . . without a doubt . . . is the most useful buying catalog in your office

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Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

Aeroil Products Company
American Steel & Wire Div.
Anthony Company
Armco Drainage & Metal Products, Inc.
Austin-Western Company
Badger Machine Company
Barber-Greene Company
Bicknell Manufacturing Co.
Blaw-Knox Company
Briscoe & Son, E. B.
Bros Boiler & Mfg. Co., Wm.
Buffalo-Springfield Roller Co.
Butler Bin Company
Carey Manufacturing Co., Philip
Chrysler Industrial & Marine Engine Corp.
Clark Equipment Company
Cleveland Trencher Company
Colorado Fuel & Iron Corp.
Concrete Surfacing Machine Co.
Continental Motors Corporation
Cummer & Son Co., F. D.
Cummins Engine Co., Inc.
Detroit Diesel Engine Div.
Dorsey Trailers
Electric Tamper & Equipment Co.
Erie Strayer Company
Flexible Road Joint Company
Flintkote Co.
Galion Iron Works & Mfg. Co.
Gar-Bro Manufacturing Co.
Gar Wood Industries, Inc.
General Motors Corp.
Gledhill Road Machinery Co.
Goodall Rubber Company
H & L Tooth Company
Harnischfeger Corporation
Heil Company
Heltzel Steel Form & Iron Co.
Henry Manufacturing Co., Inc.
Hogan Company
Hough Company, F. G.
Huber Manufacturing Co.
Ingersoll-Rand
Jackson Vibrators, Inc.
Joy Manufacturing Company
Keystone Asphalt Products Company
Kiesler Company, Jos. F.
La Crosse Trailer Corporation
Le Roi Company
Littleford Bros., Inc.
McKiernan-Terry Corporation
Mid-Western Industries, Inc.
Minneapolis-Moline Company
Naugatuck Chemical Div.
Owen Bucket Company
Pacific Car & Foundry Co.
Pioneer Engineering Works, Inc.
Reliance Steel Products, Inc.
Republic Steel Corporation
Rogers Brothers Corp.
St. Paul Hydraulic Hoist
Seaman Motors, Inc.
Servicised Products Corp.
Shawnee Mfg. Co., Inc.
Shunk Manufacturing Co.
Stow Manufacturing Co.
Symonds Clamp & Manufacturing Co.
Timken Roller Bearing Co.
Toncan Culvert Association
United States Rubber Company
United States Steel Corp.
United Steel Fabricators, Inc.
Wellman Engineering Company
Wico Electric Company
Wisconsin Motor Corporation

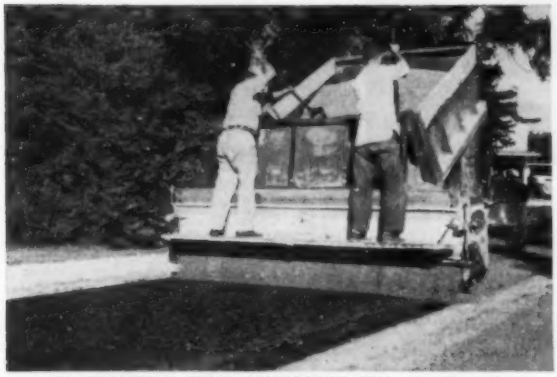
Plant Mixing of Bitumuls Retread Aggregate Speeds Indiana State Road Reconditioning



A MODERN TRAVEL-PLANT CONTINUOUS MIXER lays down a perfect carpet of Bitumuls Retread mix.



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"Versatile, Low-Cost" Say Indiana Engineers

Bitumuls Retread is suitable for resurfacing or new construction. In combination with Bitumuls Penetration, or used alone, it has wide application in reconditioning roads retaining a reasonably sound base. Indiana engineers, early users of this type of surfacing made wide use of Bitumuls Retread on their highways. They find that a single pass generally is adequate for coating all stone. In West Virginia, Michigan, New York and California, highway engineers cite these advantages: (1) No heating is required to load or unload Bitumuls Retread, (2) Mixing operations are not handicapped by wet aggregate, (3) Greater spread in volume per day per unit.

With Bitumuls Retread, worn road surfaces are literally transformed in appearance, riding properties, and durability, at comparatively low cost. In addition the large volume possible with this simple reconditioning method makes it the *fastest* effective method available.

Call the Bitumuls Field Engineers near you for data on Bitumuls Retread or specifications on other Bitumuls emulsified asphalts you can use on a full range of construction types.

. . . for more details circle 179, page 14

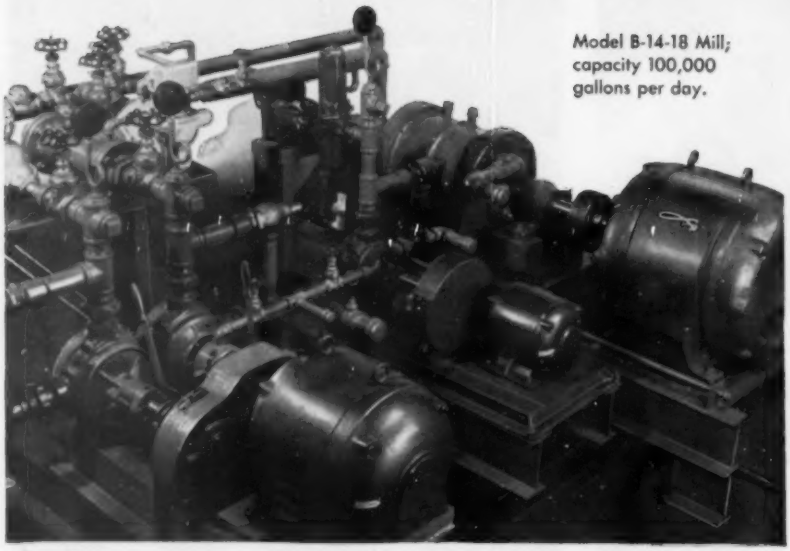
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Model B-14-18 Mill; capacity 100,000 gallons per day.

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Besides producing asphalt emulsions which meet all specifications of A.S.T.M., A.A.S.H.O., Asphalt Institute, and the various state, county, and city public works departments... McConnaughay Licensees manufacture and recommend Weather-Proof Emulsions with these special qualities:

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Complete test procedures and specifications will be mailed upon request. You can always be sure of getting accurate information and fast, dependable service on asphalt emulsions and mixes by calling any of the McConnaughay Licensees listed. Take advantage of this exceptional service. Get in touch with your nearest McConnaughay Licensee or contact...

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Malden 48, Massachusetts

C. C. Plumb, Elmwood Station
P. O. Box 65, *Providence 7, R. I.*

C. C. Plumb
Portland, Connecticut

Albany Asphalt & Aggregates
75 State St., *Albany, New York*

Knight Paving Products, Inc.
1655 Union Rd., *Gardenville, N. Y.*

Knight Paving Products, Inc.
Vine Street, *Ithaca, New York*

Knight Paving Products, Inc.
1980 *East* Ave., *Rochester 10, N. Y.*

Knight-Bitumen Corp.
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Brookman Construction Co.
17th & Gharkey Sts., *Muncie, Ind.*

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Asphalt Materials & Construction, Inc.
960 E. 22nd, *Indianapolis 2, Ind.*

Ready-Mix Asphalt, Inc.
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Walsh & Ikeler
R. R. #2, *Gary, Indiana*

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Bituminous Materials Co.
318 Atlantic St., *Bay City, Mich.*

Emulsions, Inc.
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Plants:
Spirit Lake, Iowa
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Eastern Representative:
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157 Church St., *New Haven 10, Conn.*

K. E. McCONNAUGHAY LAFAYETTE INDIANA
EMULSIFIED ASPHALT *PLANTS AND PROCESSES*

. . . for more details circle 228, page 14

VIEWS AND COMMENTS

By H. G. Nevitt

Where Do We Go In Bituminous Design?

We have previously indicated the feeling that a look at the trend of bituminous design was in order. As one phase of such scrutiny we outlined the three fundamental approaches (rational, model, and empirical correlation) available in formulating a design technique, along with their merits and their criteria of suitability. We hope that some of our readers have studied from such a standpoint the well-known methods now used in designing bituminous surfaces. We wish to offer our own reactions on the subject.

If any method is claimed to be scientific and rational, therefore justifying an exact analytical and mathematical approach, it is the triaxial. Its proponents certainly discuss it as though it is such a method. Let us see how it meets the tests for this approach.

Triaxial Assumptions

Are the assumptions behind the analysis logical and clearly correct? We frankly do not know all of them. The connection between the triaxial test on a cylindrical specimen and failure of the surface under load is certainly a devious one, requiring far more assumptions and/or analysis than is involved in the interpretation of the triaxial data itself by the derivation of the angle of internal friction and the cohesive force from the Mohr diagram. The action of the underlying course and many other variables must be assumed in applying the Mohr diagram results in an analysis of the action of the surfacing. We have not happened upon any attempt to clearly trace this connection, but we strongly question if there would be general agreement with all the assumptions implied in it.

However, there is dispute in the analysis from the very start. Authorities such as Housel maintain that the basic Coulomb assumption does not apply to bituminous mixes. They are certainly not homogenous nor necessarily isotropic, even though such might seem safely assumed for a fine-grained soil where the size of the majority of the discrete particles composing it is small as compared to the test equipment. The mere fact that the Mohr diagram obtained is often curved is enough to raise doubts. It is like arguing that Euclid's theory of parallelism holds, yet at the same time admitting the lines do get a little nearer together as infinity is approached.

Application of the shear box test developed by Calderon throws doubts upon the Mohr diagram data obtained in the usual equipment, which alone raises the question whether our present triaxial interpretation is faulty, even if the basic principles are sound.

We recognize that this matter can be argued indefinitely. However, we think it prima facie evidence that an analytical method is based upon doubtful assumptions when such are so open to question. The triaxial approach does have many merits. It correctly evaluates the resistance properties of a bituminous mix as a two-dimensional quantity, offers two parameters which have some physical significance even if they cannot be exactly interpreted as commonly assumed, and in general is a very useful approach, particularly for research purposes. Practically, it is not too good a method; some empirical variant, such as the stabilometer, seems more useful. However, we believe that at present this test must be classed as essentially falling into the third type of design approach, in which some correlation is empirically developed by experience between the resistance characteristics of the surfacing and the parameters developed from the test.

Marshall Technique Discussed

Probably the design procedure most widely used is the Marshall technique. It clearly belongs in this third classification, with the merits and disadvantages thereof. The same statement appears to apply to all the other methods in use. We are driven in consequence to the conclusion that the basis of modern bituminous design is essentially dependent on one type of approach. In it a sample, supposedly identical with that which would be obtained from the finished pavement at the time of greatest stress, is tested for one or more properties; the correlation between these property values and the load-carrying ability of the pavement is then established by empirical correlations, and utilized for design.

If this conclusion is correct, the merits of any particular present method will depend upon the accuracy with which the sample tested does resemble the finished pavement, and the correlation which can be built up between the properties found by the test and the resistance values of the pavement in actual use.

We recognize that such a conclusion is extremely distasteful to many of the more scientifically bent among highway engineers. They like to argue that traffic produces stresses resisted by shear and cohesion, that these latter can be measured in a specimen, and therefore the ability of the tested sample to withstand traffic stresses can be determined logically, if not perhaps too directly. This simple argument is very appealing but we fear upon analysis it will turn out to be primarily wishful thinking.

Undoubtedly the effect of traffic is to develop shear, compression, and perhaps tensile stresses in the pavement; since all resistances can be broken down into these three components, this statement is almost irrefutable. However, the mechanics of such stress action — and their interrelationship in a surface predominantly subjected to a sequence of rapidly applied light loads, in which the failure is due to cumulative effects — does not necessarily have any constant relationship to the combination of these stresses in testing a specimen with a continuously applied load under circumstances differing in many other respects.

Similarly, the resistance factors developed in the two circumstances may not bear any constant relationship. That there might be some correspondence between the two we will readily agree; both logic and experience so far indicate such is in a general way

(Continued on page 147)



● Etnyre distributor applying 2.3 gal. per sq. yd. for penetration macadam base.

How to Build Bituminous Shoulder — 2 Miles a Day

Good equipment including some special gadgets enabled Villa Contracting Company, Inc., to make remarkable speed on 50,000 sq. yd. of penetration shouldering.

THIS summary is a sequel to the one in August ROADS AND STREETS, which described the speed record set in third-laning the dual Garden State Parkway in New Jersey.*

Here described briefly are the steps taken by the same contractor in constructing a bituminous inner shoulder along the new slab. Villa Contracting Company, Inc., of Westfield, performed this work on the heels of the paving work, as part of their contract to widen 13½ miles of parkway — the old section which lies between



● Michigan tractor-shovel was a king-pin machine — used throughout for clean-up, leveling, etc.

*"Paving Speed Record Set in Widening Jersey Parkway," ROADS AND STREETS, August, 1955.

● Another Michigan tractor-shovel was equipped with an extension box, bolted on the end of the scoop, for gouging rough widening trench.

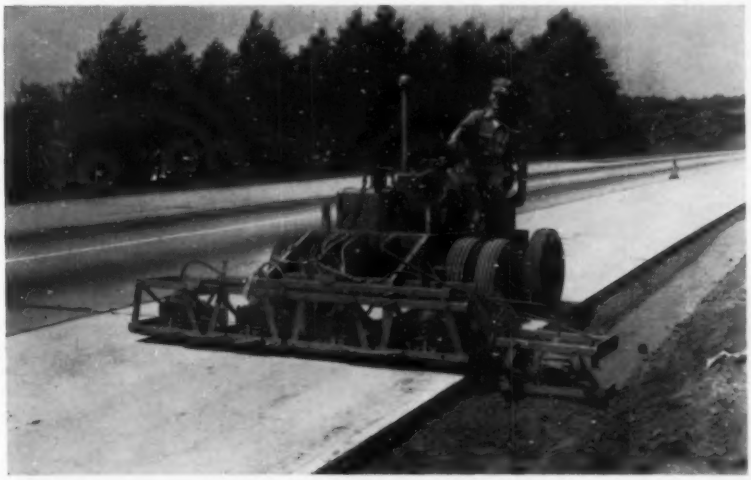




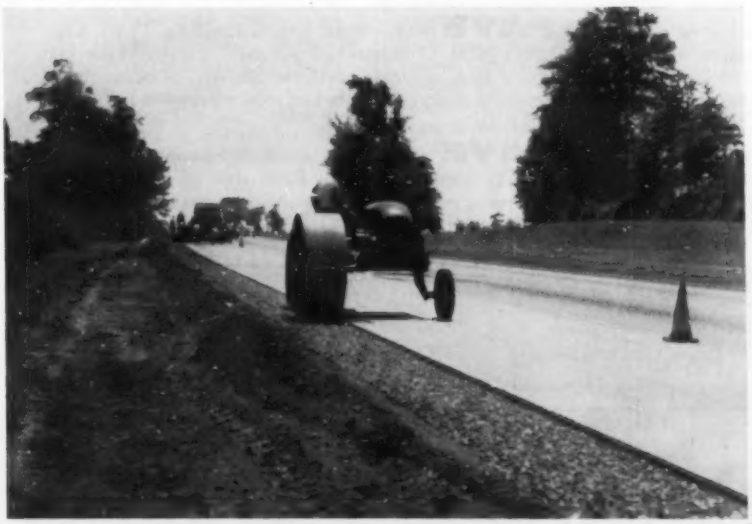




● Caterpillar 12 grader with special drop blade section perfected the widening trench in one or two passes.



● The subgrade was compacted with a Jackson shoe-type vibrator.



● Trench roller on base stone, a Buffalo-Springfield.

U. S. 22 intersection and the Raritan River bridge.

Most of the new lane was located on the median or inner side of the existing two-lane roadways. An important part of the contract was to construct a new inner shoulder. The shoulder design includes an 8-in. crushed stone base, penetrated and covered; and 2-in. asphaltic concrete surface, placed in a single course.

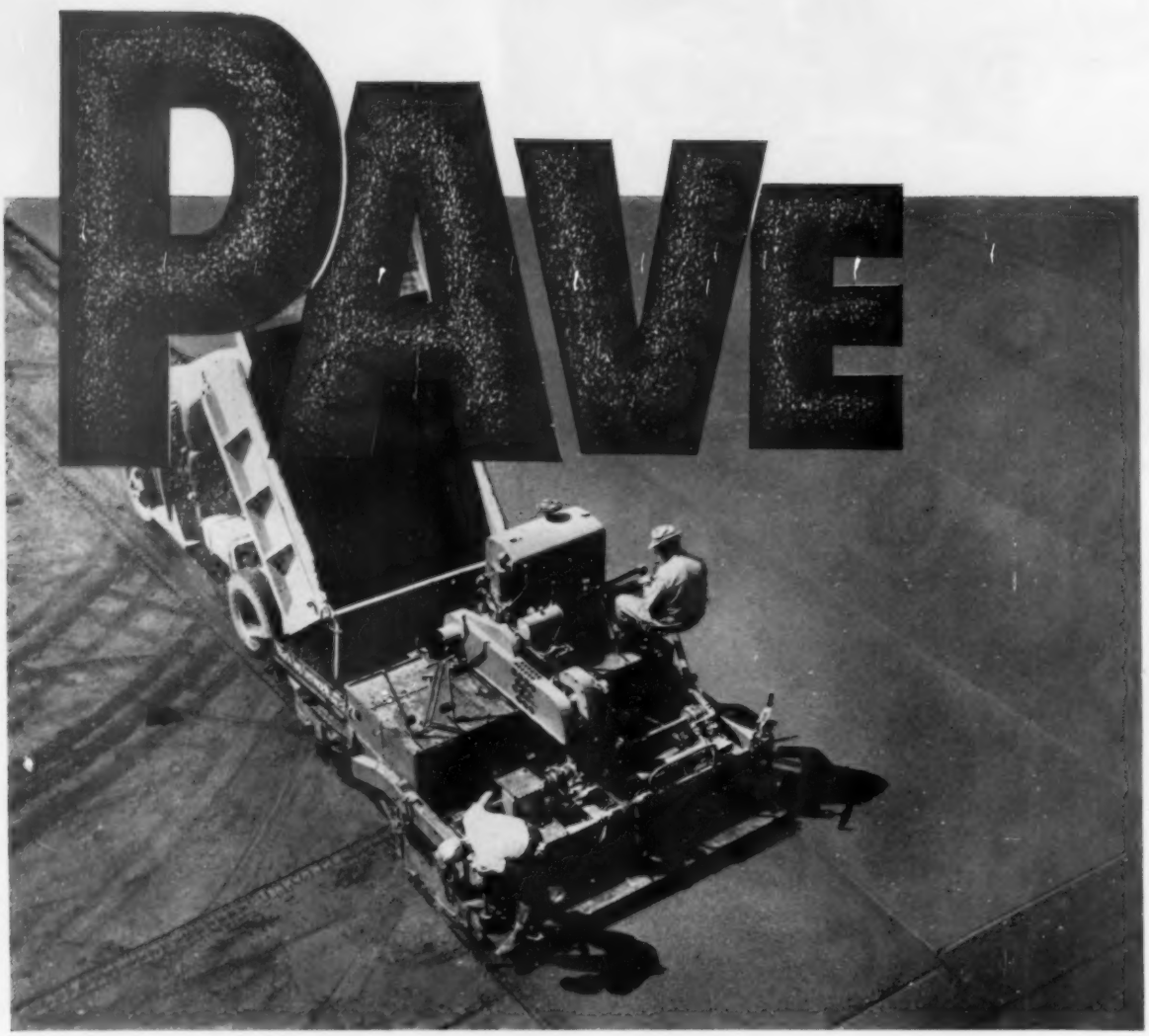
The contractor worked along one roadway entirely through the job, and back along the other, as in the paving work. In order to maintain a pace of about 2 miles per single-shift day for the various steps, the company handled the job as follows:

1. Earth which had previously been thrown against the edge of the new pavement slab was trenched roughly using a Michigan tractor-shovel, on which was bolted a special bucket extension box, designed for scooping out trench (see photo).

Sometimes the operator found it expedient to redistribute substantial quantities of shoulder earth along the pavement, in order to balance out areas having either too much or too little material for trenching and subsequent leveling. This was done either by dozing material with the scoop blade, or by picking up boxfuls with the special widening-box attachment in the midst of trenching.

2. During this preliminary operation another tractor-shovel also found time to perform various clean-up and leveling tasks, loading excess material into trucks for disposal.

3. Next came a refining pass to bring the trench to accurate cross-section. This was done with a Caterpillar 12 motor grader, using a special drop blade section. Two short lengths of standard blade, cut to contour, were bolted on the end of the standard blade, as shown in one of the



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PAVE with any bituminous mix—hot or cold—with the world's most widely accepted bituminous paver. No other machine or method will lay bituminous mix as quickly, perfectly or economically.

PAVE smooth riding surfaces, even over irregular bases. Automatic leveling increases or decreases the thickness of the mat to compensate for depressions or bumps in the existing surface.

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CONVEYORS LOADERS DITCHERS ASPHALT PAVING EQUIPMENT

. . . for more details circle 182, page 14

accompanying photos. A guide fin (not visible in picture of earth covering) helped the operator make his cut without throwing excessive amounts of earth onto the pavement. He cleaned off the pavement by making a separate pass.

4. The subgrade was compacted with a Jackson shoe-type vibrator, using a 2-ft. wide shoe. The shoe covered the full 3 ft. trench width in two passes.

5. Crushed stone was placed with an Apsco widening spreader in a single lift. (Not pictured).

6. Stone was rolled by two or three passes of a Buffalo-Springfield trench roller weighing 4,000 lb. per ft. of roller width. The chief purpose was to see that the stone was properly keyed and consolidated, without degradation which would reduce voids for penetration.

7. The stone was penetrated (6 in. penetration depth specified) by applying about 2.3 gal. per sq. yd. of OA-4 asphalt, the application temperature being specified at 350 deg. F. This was done with an Etnyre 1,300-gal. distributor by Asphalt Service Company, of New Brunswick, New Jersey.

8. A light cover of ⅜-in. stone was immediately placed.

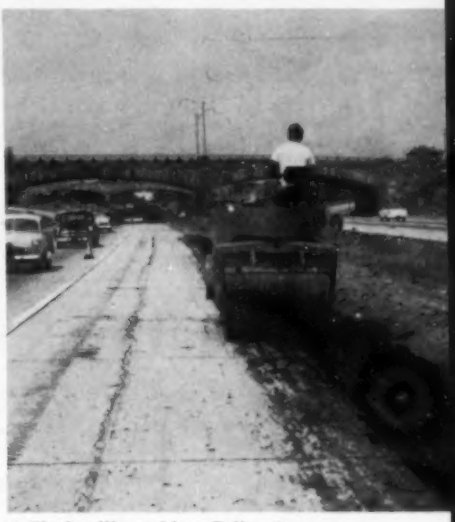
9. Hot mix asphaltic concrete made with 1½ in. maximum stone was placed for the 2-in. surface, using another Apsco machine, and rolled with a 5-ton Galion or Ingram roller.

The Villa organization maintained a pace of about 10,000 ft. per day for the various operations, which were of necessity stretched out over several miles. Radiotelephone via the company's General Electric equipped cars and trucks helped expedite the job, which often would have entitled serious management problems otherwise due to the stretched-out location of the various machines. The shoulder work was cleaned up in July.



● Laying asphaltic concrete topping with an Apsco spreader.

According to state highway engineer Edward Kilpatrick, reconstruction of considerable outer 10-ft. shoulder would be tackled next. This work will involve sections where traffic was temporarily diverted to the existing earth shoulder during the widening work. These shoulders besides being damaged were in need of strengthening anyway. The old shoulders would be scarfied, and stone added. About eight miles of 10-ft. wide penetration construction is planned for autumn.



● Final rolling with a Galion 5-ton tandem. Operator seen making first breakdown pass, covering inner half of strip. Succeeding passes work toward outer edge.

● New cut drainage was a preliminary part of the widening, required in this instance where the new pavement lane was built outside of the existing lanes. Porous concrete drain pipe being laid with porous backfill.

Public Works Congress to top all records

We'll be seeing you at the 61st Annual Public Works Congress and Equipment Show, Milwaukee, October 2, through 5. Better get your reservations now, if you haven't already. A sell-out is expected.

Seventy manufacturers and suppliers have over 40,000 sq. ft. of exhibit space, and the technical committee chairmen have lined up one of the best series of meetings in APWA history.



● Villa Contracting Company's chief engineer, Roger Morra, contacts his company shop via General Electric radiotelephone.





● Finished diluted emulsified asphalt base treatment is given a flush coat of from 0.1 to 0.15 gallon of undiluted material per sq. yd. No cover aggregate is required.

Emulsified Asphalt Solves County Road Maintenance Problems

By L. H. Bradley County Road Commissioner, San Joaquin County, California

The following report is taken from the transcript of a talk delivered by Mr. Bradley before a recent meeting of the Asphalt Institute in Stockton, California. Here he discusses the advantages inherent in the use of emulsified asphalt for county road maintenance.

SAN Joaquin County puts out to formal contract some $300,000 each year, which meets our Federal Aid Secondary requirements and other county projects. Plans and specifications are prepared and the latest thinking in design and technique is incorporated therein. For this $300,000, we build some ten miles of road. I don't worry too much about those jobs that cost $30-40-or $50,000 per mile. We have a very competent Engineering Department and a well equipped laboratory. We can take routine or major problems in our stride. If we are swamped by a problem beyond our ability we can always get help from the California Division of Highways.

The total budget of San Joaquin County is about $1,500,000 yearly. We have 1,700 miles of road of which some 200 are built to a tolerable or better standard. *My real problem and worry comes from the need to repair 1,500 miles of poor road with the remaining $1,200,000 — 150 times the mileage on four times the money.*

A typical maintenance project is the Atherton Road that crosses five miles of the worst peat in the County on a narrow, low levee. These five miles had become so warped from subsidence that speeds were limited to 15 miles per hour. There were so many chuck holes that it was a physical impossibility to keep them patched. A fishing resort at the end attracted hundreds of people every week and heavy tonnage of farming product had no other outlet. The road could certainly be called impassable. The public demanded that repairs be made. There were no funds for construction based on high standards. There could be nothing gained by calling in the engineers as we could not afford their recommendations. After all, 5 miles of untreated rock base at 4000 tons per mile, with a delivered price of $2.50 per ton would cost $50,000 — an expenditure equal to our gravel budget for the entire year for the entire county! It could not be considered a cheap source of pit run gravel. I found a material that had been condemned. Those that wouldn't use it were legion. We had to use it. We had no other choice. We did not dare to reshape the road to a uniform cross section, since we could not afford to destroy a certain thickness of stabilized peat.

For Base Treatment

The trouble expected from this type of construction was not long in coming. Thin spots in the blanket of gravel dried quicker than the thick ones. The rainy season was near and in desperation I used dilute Emulsified Asphalt SS-1 in order to stabilize the gravel. The one thing I want to talk about is dilute SS-1 or SS-2. We put 200 gal. of SS-1 in a 1000 gallon water wagon. We filled the balance with water. We placed 1 gallon of the mixture per lineal foot or about 6 gallons per cubic yard. We mixed the top 3 in. with blades and rolled it lightly. There was time to do a half mile before the rains drove us off. Next spring I went back to the road. The first 4½ miles were in bad shape but I was pleasantly surprised to find the treated half mile in excellent condition. The surface was hard and firm and showed no distress other than a slight abrasion. We used various tricks to bring the mileage into shape but road mixing 2 in. of additional material was sufficient for the semi-stabilized area. A seal coat was applied throughout and the road shows no distress after a full year of heavy tonnages. This section of road has been repaired many times during the years and I do believe this last effort will be more successful than any of the others.

For Dust Palliative

We have learned to use dilute SS-1 for so many purposes. It has become one of our tools. As a dust palliative it is superb.

Formerly we put down a light application of SC-1 cutback asphalt. We would follow this with a sand truck but could never quiet the public criticism caused by tracking and spraying cars. Now we use SS-1 Emulsified Asphalt diluted with 8 parts of water and spread it with the water wagon. Traffic has immediate use and we don't sand it. It will not pick up and cannot be detected on any surface such as cars, houses, etc. We have had no more insurance claims from irate motorists. One application will hold the dust for six weeks and three applications will give a thin bituminous surface that often makes further treatment unnecessary. Our public relations are vastly improved and costs are attractive.



● Single application of emulsified asphalt puts new life into weathered pavement surfaces.



● This tight, uniform texture was obtained by a single application.

Primes and Seals

We have used this new medium as a prime coat in our sandy loam areas. Here grading is done in the winter time but we must hold the road until mixing time some 4 months away. A cutback prime is difficult to use in cold, wet weather. But a dilute SS-1 emulsion will penetrate easily and get us by until roadmixing can be done.

Another use for this emulsion is on seal coats. We are bothered in the subdivision areas by whip-off getting into the concrete gutters. We found that an application of dilute SS-1 placed immediately after rolling, will



● Diluted emulsified asphalt base treatment is compacted with standard three-wheel roller. Note smooth, dense texture of finished base after rolling.



● Diluted emulsified asphalt base treatment offers many economies. For maintenance of good, stable haulroads by this method, water-wagons, like those shown here, blade grader, and roller are the only pieces of equipment required.

fix all loose chips and reduce whip-off to a practical minimum.

Our method of application is very simple. It requires no new equipment. We use only a water wagon. The instructions to the driver are elemental. He puts a definite gallonage of SS-1 in the tank and then fills with water. The ratio of emulsion to water is about 1:3. We have found, by cut and try, that this ratio will cement the chips but is not tacky. Traffic can use it immediately. As to rate of spread — the driver is merely told to keep it on the road. Spread it lightly enough so that it stays on the rock and doesn't run off into the gutters.

Of course whip-off is caused by many variable factors. It should be controlled from the bottom up. The method I just described is used only when there is no place to waste a normal loss of chips.

On one road we used the solution for delineation. We had built a section 40 ft. wide, roadmixed the central 24 ft. and placed a seal coat over the entire width. Traffic began to travel on the shoulders since the entire width had the same appearance. An application of dilute SS-1 over the central 24 ft. delineated the width that was road mixed. Traffic moved onto it and our shoulders were thus protected. Controlled whip-off was a further dividend.

Slurry Seal

I believe it is appropriate at this time to mention another use of dilute emulsion, a use that is becoming ever more popular at this moment. An idea that you can use in the morning if you want to. I refer to slurry seal. My good friend, Sam Kennedy, Road Commissioner of Los Angeles County is now pioneering the use of this material. It is basically simple. Combine emulsion, water and sand in a cement mixer so that you have a very sloppy solution and pour it on your road. Spread it by any squeegee device your ingenuity can develop. You will effectively seal and fill all cracks. You can build up low areas, etc. I think its potential is tremendous. We haven't used it yet but I surely intend to try. Mr. Kennedy has determined certain optimum proportions which I will use. But if I didn't have them I would go ahead anyway. I have learned, during the last three years, that it is almost impossible to make a mistake in proportions of emulsion and water! You can do everything wrong and come up with a good job. Don't be afraid to try. One word of caution — DON'T attempt to dilute a penetration or RS or quick breaking type of emulsion. You are waiting for trouble and BAD trouble if you do.

Texas road network to have needs study

The Texas highway commission has arranged for an independent survey of the state's highway needs and program, with special study of related major problems.

The survey which has a late 1956 deadline will be made by the Texas Research League, a citizen supported, privately financed governmental research organization which makes objective factual studies of the operations and problems of Texas state government. It will be performed without cost to the state as a "contribution to the cause of better Texas government."

The survey will include an appraisal of the adequacy of the statewide network, and a study of highway administration and financing at the state and local levels.

Massachusetts dump truck rental rates up

Answering a petition of the Massachusetts Dump Truck Owners Association for an increase in ton-mileage and hourly rental rates on dump trucks, the Massachusetts Department of Public Utilities has issued an order authorizing an increase in minimum rates for the State, as of September 1, 1955.

Increase in ton-mileage rate for all commodities, other than asphaltic hot mix, has been authorized to 25 cents for the first mile, plus 5 cents for each additional mile. The yard-mile rate for such commodities will be 35 cents for the first mile, plus 8 cents for each additional mile.

A separate rate gives 30 cents for the first mile for bituminous concrete plus 5 cents for each additional mile, the 5 cents supposed to compensate the carrier for waiting time. The old rates for all commodities, including hot mix were 20 cents for the first ton-mile plus 4 cents for each additional mile and 28 cents for the first yard-mile, plus 6 cents for each additional mile.

Ohio expands radiotelephone

Radio communication facilities of the Ohio Highway Department are being expanded, with contracts awarded for seven radio transmitting towers and equipment and for 150 mobile receiving stations.

This move follows an experimental installation in Ashtabula County. Under the new program, maintenance truck operators will be able to communicate with each other and with the base station; weather information vital to maintenance and public contact on emergencies can be disseminated; advice passed out on road conditions, snow removal work better controlled and expedited.

PLANNING YOUR ROADS FOR "FUTURE" TRAFFIC?



In the next ten years you should see some 20 million more cars on the road. This means bigger problems in maintenance, particularly if main streams of traffic have to be re-routed through your community. And one of the most efficient and economical methods of minimizing maintenance problems and increasing the load-carrying capacity of roads is to use Surfa-Sealz Pellets.

Surfa-Sealz Pellets were specifically developed to eliminate the usual problems in obtaining a rubber-bituminous mix. You don't need to worry about a hot premix or a specially equipped plant. Surfa-Sealz Pellets make every hot mix plant a potential rubber mix producer. And what's more, Surfa-Sealz will not clog or interfere with the operation of conventional equipment.

Surfa-Sealz will bind the asphalt to the aggregate and prevent the asphalt from bleeding to the road surface. This will minimize water penetration, cracking and pot holes.

Surfa-Sealz will stabilize the asphalt by holding in the mix those volatiles which keep the asphalt pliable and resistant to embrittlement. It prolongs pavement life. Try it in your mix. Examine it! Try penetration tests over a period of time and see for yourself how Surfa-Sealz keeps your pavement resilient and stable longer.

For sample Surfa-Sealz® Pellets, technical information, and current performance reports, write to us, TODAY.

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. . . for more details circle 232, page 14



● Ditcher at work on Ohio Turnpike interchange job.

Dig turnpike trench inches from drop-off

Two ditchers with special off-set digging wheels have enabled Henkels & McCoy, Philadelphia contractors, to excavate trench for lighting cable at interchanges of the Ohio Turnpike under conditions that would be impossible with other ditchers.

Lighting cable is being installed at all 17 interchanges of the turnpike by Henkels & McCoy. Each interchange requires from 10,000 to 30,000 feet of trenching.

Although trench for the lighting cable averages only 30 in. deep and 15 in. wide, a trenching problem existed because specifications required that the trench be excavated 13½ ft. out from the pavement edge. This placed the trench only a few inches away from the top of fill slopes. Ditchers with centered digging wheels couldn't excavate as close to the edge of the grade drop-offs as required because they would have no support for one of their crawlers.

The equipment used consisted of Gar Wood-Buckeye Model 306 ditchers. These units were equipped with special off-set digging wheel frames which allow the digging wheel to trench in line with the outside edge of either crawler, so that trench can be excavated right on the edge of the drop-offs. Ditch production averaged 3,000 ft. per day with the two machines, slowing to 2,000 or 2,500 ft. in rocky fill.

Merritt-Chapman & Scott takes over Savin Company

Acquisition of Savin Construction Company, large New England highway and airfield builders, is announced by Merritt-Chapman & Scott Corporation.

The merger includes Savin's subsidiary, the Whaling City Dredge and Dock Corporation of Groton, Connecticut.

The two companies will operate as members of Merritt-Chapman & Scott's construction division which engages in a broad scope of industrial, building, chemical, marine and heavy construction.

Savin, founder of the firm, in 1928, continues as President and Treasurer of his companies and will direct their operation.

Littleford 157 Portable TRAIL-O-ROLLER
rolls more jobs per day thanks to

Efficient Rolling



Littleford 157 Trail-O-Roller rolls within 4 inches of walls, poles, platforms and other obstructions (with trailing wheels removed).

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454 E. Pearl St., Cincinnati 2, Ohio

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. . . for more details circle 227, page 14

Court Decisions That Affect Jobs

Hired driver-owner status

By William Hurd Hillyer

Contractors, no matter how careful in their choice of employees, are nevertheless open to suits for negligence. The following North Carolina case is of interest because the court in its decision clearly defines employer-employee relationship and consequent contractor liability respecting a hired truck and its owner-driver.

The paved portion of a certain highway had been widened 3-ft. by a corporate contractor under agreement with the State Highway and Public Works Commission, when a 100-ft., yardwide strip proved defective and was excavated to a depth of about 18 inches preparatory to being repaved.

A half-sawhorse barricade with one end of the bar elevated by 3-ft. uprights was so placed across the north side of the highway that its upright end encroached about 2 ft. upon the old paving. Some 350 ft. east of the barricade was a large road sign reading "Construction Ahead." Fifty feet east thereof was another sign, "Slow;" and two miles further east was a third warning: "Danger — Road Construction," with contractor's name underneath.

Despite all these precautions, near-tragedy lurked along the narrow stretch of roadway parallel with the portion being repaired. A motorist and an eastbound dump truck owned by its contractor-hired driver, traveling at respectively 30 and 60 miles per hour, entered the narrow strip almost simultaneously. The motorist testified in court that he had already passed the barricade when he saw the oncoming truck leave the paved portion on its right and run for a short distance on the dirt shoulder, then suddenly swerve back apparently out of control. It collided with the motorist's sedan, injuring him seriously. During his suit against the road contractor and the owner-driver of the truck, both denied negligence. The contractor tried to put all possible liability on the owner-driver.

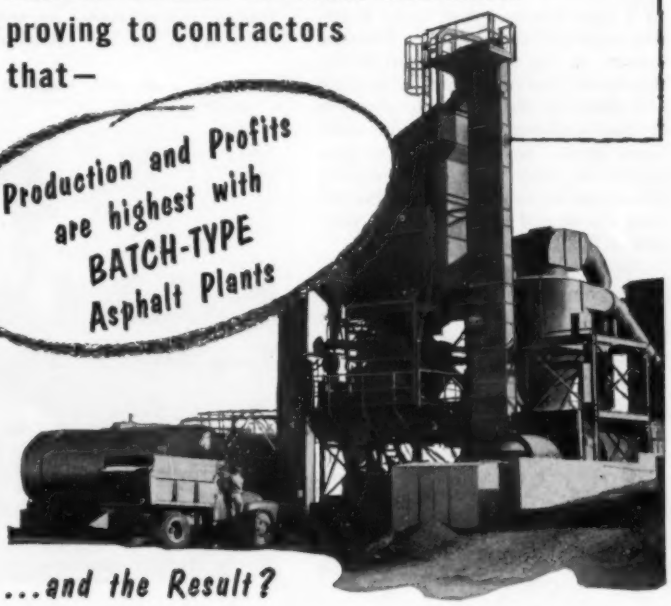
The trial court caused a $27,000 judgment to be entered in favor of the motorist, after the jury had chosen to believe him instead of the truck driver.

The State Supreme Court granted a new trial on purely technical grounds, but viewed the contracting firm and the owner-driver of the truck as equally liable. The legal test for determining the relationship as that of employer-employee, held the higher tribunal, is the right to control the "workman" with respect to the manner and method of doing the work, as distinguished from the mere right to require those results for which he is hired. Whether or not the employer actually exercises control, is not material. In this instance the contractor removed all doubt as to his liability by exercising control, reserving the right to discharge truck owner for unsatisfactory services, besides directing the loading and unloading of the truck. *Harris vs. White Construction Co. Supreme Court of North Carolina 82 Se 2d 689.*

• G. Franklin McSorley of Pittsburgh, has been appointed chairman of the Pennsylvania Turnpike Commission. He succeeds Thomas J. Evans, recently discharged from this post by the new state administration after long service. Mr. McSorley will be the third commission chairman in the 17 years of the organization's existence.

FOR 60 YEARS...Cummer has been proving to contractors that—

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...and the Result?

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This is very gratifying to The F. D. Cummer & Son Company, pioneer designers and builders of batch-type asphalt plants like the one shown above, owned by Dolomite Co., Rochester, New York. This is a stationary plant with a guaranteed minimum capacity of 100 tons per hour. For three generations batch-type plants have been the only kind made by Cummer.

Contractors profit by Cummer's exclusive concentration on batch-type plants. They make possible reliable, dependable service. Customers know that asphalt produced in Cummer plants will be delivered "as ordered." And Cummer plants have longer lives and exceptional resale value because batch-type plants do not become obsolete.

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... for more details circle 196, page 14

Special Hold-Down Device Aids

Fabric-in-Asphalt Placement

Notes on resurfacing of wartime concrete pavement at Willow Run airport near Detroit, where welded wire mesh is being placed to control reflective cracking.

WILLOW Run Airport, of wartime bomber plant fame, is getting a partial black topping. Principal interest in this project centers in the large-scale use of welded wire mesh embedded in the asphaltic concrete overlay; and particularly in the hold-down device developed by the contractor to keep the mesh properly ironed out under the paver. This has been a source of trouble on some projects of this kind.

The improvement, designed to strengthen certain pavement for heavier plane loads, involves overlays on the center taxiway and west ramp. The concrete pavement here consists of 10 x 20 ft. slabs, designed for single wheel loadings ranging from 45,000 to 75,000 lb. The existing concrete is badly cracked in some places, with corner breaks in evidence, reflecting the fact that the thin 6 to 8 in. "no-steel" wartime design has proved inadequate for the service conditions.

In order to reduce maintenance and strengthen these sections against further deterioration, an overlay of 3-in. depth on hot mixed asphaltic concrete, with welded wire fabric, was adopted. For purposes of comparison and study certain "control" sections are included in the project. A taxiway strip is being paved with the following adjacent sections:

Five hundred seventy-five ft. of taxiways to have 4-in. resurfacing, without fabric; 400 ft., 3-in. thick without fabric; 400 ft., 3-in. thick, with fabric; and another 400 ft. of 3-in. without fabric.

● Placing mesh, well ahead of paver. Mesh sheets were overlapped one square, and tied.



● Showing sled runner under Barber-Greene paver (see arrow). This device successfully held fabric in position.

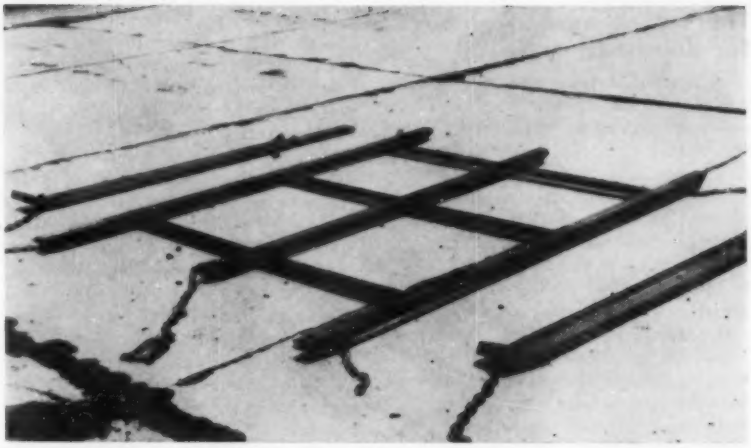


The remainder of the resurfacing project includes fabric. In all there will be 20,000 sq. yd. of overlay for the 2500 x 70 ft. center taxiway; 34,000 sq. yd. for an irregular ramp area; and 16,000 sq. yd. of ramp at another location — 70,000 sq. yd. in all.

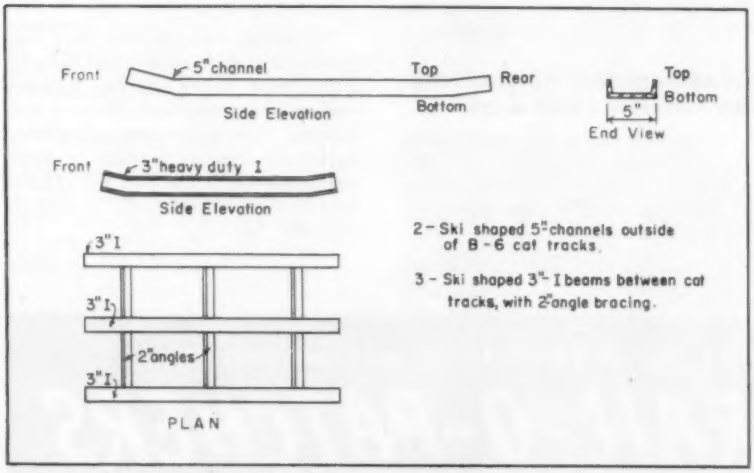
As a preliminary, certain of the deteriorated slabs were replaced with asphaltic concrete. This work plus fillet areas, etc., bring the job quantities to 8,900 tons of binder course mix, 4,500 tons of surface course mix, 178,000 lb. of fabric (3/6 — 10/10); 375 cu. yd. of crushed aggregate base for repairs; 1,200 sq. yd. replacement concrete; and 8,300 gal. AE-2 emulsified asphalt for tack coat.

The contractor placed all mix with a Barber-Greene finisher equipped with the special hold-down device here sketched and pictured. This device is considered by observers to be an improvement over previous methods. It consists of a sled, double-ended, so that the paver can back up, maneuver, or turn around to start another pass without the necessity of detaching the hold-down with consequent loss of time. The entire length of the sled rides on fabric, keeping it ironed out immediately ahead of the paver's conveyor screw. Angles between the sled and the chains at both ends have prevented lateral "wandering" of the sled.

As a measure of the efficiency with which paver operations progressed using this device, the paver has averaged 100 tons per hour, placing as high as 1,330 tons in one 12½-hour working day.



● The hold-down sled and runners devised by the contractor.



● Details of the special hold-down device.

The procedure was to place the fabric well out in advance of the paver, which has entailed no ill effect such as twisting or distortion of the fabric. Asphalt trucks traveled over the mesh, the mesh being placed with transverse wires down to facilitate wheel passage. The fabric is in 6 ft. long x 9½ ft. wide sheets, spaced to allow a 6-in. gap between lanes. In order for the fabric to straddle longitudinal joints spaced every 20 ft. in the concrete, the 10 ft. overlay lanes were begun at an offset line 3½ ft. from the first edge to provide a staggered positioning.

Rolling was done in the usual manner with a Galion 12-ton water-filled roller. After each lane was completed a tack coat was applied, consisting of .08 gal. per sq. yd. of quick-setting emulsion. The surface course was then placed in the usual manner.

The contractor is Howell Construction Company, of Howell, Michigan; Morley Durston, superintendent. E. S. Brewer Sons, of Owasso, Michigan, are consulting engineers for the project, which is being done for Airlines National Terminal Service Co., lessors of the airport from the University of Michigan. The improvements are financed by $80,000 advanced by the Civil Aeronautics Administration, matched by an additional $40,000 each from the Michigan State Department of Aeronautics and from the University of Michigan out of rental funds paid by the lessors.

● (Left): Showing mesh in place along overlay lane edge — wires have worked up to a position about midpoint in 3-in. depth of the binder course. (Right): Trucks backed up over mesh with no ill effects.





There is no excuse for deaths by falls

Addressed to Corps. engineering and supervisory personnel Corps of engineers Safety Bulletin, First Quarter, 1955.

During 1954, on Corps of Engineer projects, there were 26 contractor employees killed as the result of falls from elevated working surfaces.

Section XX of the handbook "Safety Requirements" sets up safety standards for "Ramps, Runways, Platforms and Scaffolds." Paragraph 7-8 of the handbook provides for the use of safety belts and life lines when employees are subjected to falls hazardous to life and limb. The standards set up in these requirements are not intended to be separate rules to be superimposed on the work but are merely sound practices, resulting from years of experience, that were developed specifically as considerations to be incorporated into the building, guarding, and maintaining of safe elevated working surfaces.

There is no excuse for any of these 26 deaths because in every contract that is awarded the contractor agrees to abide by the provisions of "Safety Requirements" and is paid for conducting his work accordingly. Although the responsibility for doing rests with the contractor, the responsibility for seeing that it is done rests with representatives of the Corps of Engineers.

This terrific loss of life last year indicates that we have failed to insist that safe elevated working surfaces be provided to facilitate the job with maximum efficiency, which in turn will safeguard the worker. We have no right to demand, or expect, any worker to do a good job in a reasonable length of time, if the fear of falling is present. As representatives of the Government it is up to us to see that workers are provided with a place to work with the protection they are entitled to and have a right to expect.

If during 1955, we assure that the safety provisions of the contracts are complied with we can eliminate this "MANKILLER" from our projects.

Ohio engineering students do summer road work

Forty or more young engineering students at the Ohio State University will have gotten a brief indoctrination in state highway field work before returning to school this fall.

This is coming about through a rather unusual arrangement between Emmett H. Karrer, Professor of Civil Engineering at Ohio State University, and S. O. Linzell, Highway Director. On completion of the Summer surveying camp early in August, the students were offered a six-week employment period up to the first day of Autumn semester. Director Linzell stated that he was glad to get a chance to use the services of the young men, even on this brief basis, because of the personnel shortage.

Also, he hopes that some of the men will join the highway department permanently when their schooling is done. The scale of pay is varied, depending upon the experience of the men, some of whom have previously done practical work.

"Experience indicates that frequently it is more economical to build a controlled access highway to meet modern design requirements on a new location, than to improve a highway on the old location because of property acquisition costs." — A. C. Clark, Deputy Commissioner, U. S. Bureau of Public Roads.

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Views and Comments

(Continued from page 133)

the case, just as it does with the results of the Marshall test or numerous other procedures. The point is that this possible correlation is something quite different from a direct mathematical evaluation of pavement stresses in terms of the angle of friction and cohesion determined by the laboratory triaxial test as now run. Similar comment is applicable to any other apparently rational method of design so far put forward.

The above comments do not mean that present day approaches may not form the background for a sound design method. Not merely may this be the case, but also the modifications made may not appear appreciable. Nevertheless such modifications will have to represent a considerable improvement in the basic logic behind the method, either through some change in the approach or some filling in of the present gaps.

What to Look For?

If agreement is obtained that our current design techniques are all at present dependent upon empirical correlations between arbitrarily selected (although logical) tests and pavement results in use, what must be looked out for? What can be looked forward to?

One great problem in these correlations is to make sure that the test specimen duplicates the pavement actually existing at the time of possible maximum stress. This raises the question as to whether the technique of forming the test specimen, including the formation limits (such as the quantity of compaction used), provides the conditions existing in the surface at this time of greatest stress. We question if any methods now used meet these requirements at all. Our paper at the Louisville AAPT meeting goes into this in some detail. We think this is the first point which must be clarified before we can progress much farther in any of these design procedures.

The next question is how well the correlations claimed between these test data and actual road results are substantiated in practice. The mere fact they are safe does not mean they are worthy of general acceptance. As we have frequently pointed out, an unduly safe design may represent an economic blunder as serious as failure from underdesign. Since the individuals who know most about any method are usually its users and advocates, and it is a human trend to not advertise too much one's doubts until they

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. . . for more details circle 221, page 14

have become certainties, it is difficult to get information on the exceptions to the criteria although very easy to obtain it on the cases where the rules seem to apply very nicely. However, this can be done; and the alert engineer seeking unbiased information may in due course conclude that the accuracy with which these test criteria apply in actual practice, particularly where unusual aggregates or other conditions are involved, is far less satisfactory than is generally recognized.

Making Some Progress

If this is the present situation, what of the future? This is a point on which we have the greatest concern. While adverse to the complacency which seems to surround the utilization of a number of these test methods, we are not too much disturbed about present actual results in practice. These are far superior to what we were getting in the early days, perhaps are as advanced as many other phases of highway engineering. Too much immediate concern does not therefore seem justified. Undoubtedly we are getting both overdesign and underdesign up to a certain point, with penalties either way; and undoubtedly we could build roads both better and more cheaply if the design methods which will probably come into use several decades from now were available today — or even obvious improvements made in present approaches. However, other phases of highway engineering are likewise in such doubt that we can temporarily suffer the existence of such a situation provided we are on the way towards the improvements anticipated. The question is then, "Are we on the way?"

In our discussion of the fundamentals of design in the previous issue we pointed out the possible fallacies in an approach which depended upon an empirical correlation. These may be summed up by the statement that such a correlation cannot be safely extrapolated, and it cannot be even applied unless there is certainty from every standpoint that the conditions are identical with those covered in the correlating tests. Since our outstanding need is to get design techniques which are applicable to local materials and special conditions, these objections immediately become serious. Where practically standard aggregates and methods used time after time are involved, we need very little in the way of a design technique, being able to arrive at the proper construction through the trial and error conclusions of experience; our design techniques to be really worthwhile should fit any and all conditions.

The situation here is very much a matter of personal opinion. Our own view is that the numerous efforts seen today to argue that present design techniques are rational and suitable for indefinite use (although needing refinements, such as how to cope with a curved Mohr envelop) are harmful. They threaten the development of methods which are more truly rational and will therefore escape the limitations of these empirical approaches. We certainly think that current methods should continue in use, although with a very critical examination of the results provided by continuing experience. At the same time we feel there should be more effort to get down to the meat of the matter. There should be more attempt to achieve the type of compaction given by traffic; test techniques should stress the specimen in exactly the way that traffic does so; the actual stresses resulting from traffic should be sought for and analyzed. With the time and intelligence today available for exploration of the true action of bituminous surfacings in practice, we believe there is little doubt that answers to these questions will shortly appear if attention is concentrated on the basic problems. We think that the highway engineer should familiarize himself with the techniques available, attempting to use the one he thinks most suitable for his purposes in intelligent fashion but likewise critically. We think he should at the same time be aware of the needs of the future and encourage the effort and energy required to meet them, recognizing that these empirical approaches are stopgap procedures, at least as now carried out.

Perhaps such strong statements are not justified. But we will not get progress from complacent acceptance of what we have. Fortunately some of the men who have developed present methods are showing the greatest alertness in probing into their basic lacks. If this attitude will only become general, we can look forward to the attainment of the design accuracy long ago accomplished with many other structures. Let us not merely hope for that day, but do what we can to bring it about.

Virginia bituminous experiments

The Virginia Department of Highways, this summer, started a series of experiments with different types of plant mix utilizing fly ash and round aggregate.

These mixes conform in general to the regular department specifications for different types of plant mix. Minor modifications, however, are made in the formulas to permit using materials not formerly provided for.

Purpose of these experiments is to determine what locally available materials may be used in areas where it is now necesary to purchase aggregates from distant points, freight being the major item of cost.

Fly ash is readily available in some areas from Virginia Electric and Power Company steam generating plants. In other areas uncrushed river gravel or bank gravel is available but there are no local facilities for crushing. Department specifications permit the use of crushed gravel with a minimum of 80% of the particles showing at least one fractured face.

To test the wearing quality of mixes contracts were let at various points throughout the state for laying test sections. It is not expected that any definite conclusions will be reached for several years.

The Virginia Department of Highways was one of the first to lay test sections of plant mix containing rubber. These sections were laid using natural rubber, synthetic and pulverized rubber (ground from used tires).

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65-Day Delay Limit in Final Estimates

A NEW law in Massachusetts passed with the endorsement of the New England Road Builders Association, requires that final estimates be prepared within 65 days after satisfactory completion of the contract.

As enacted into law the bill provides that within 65 days after the work required by a contract for the "construction, repair, alteration or improvement of public ways, including bridges and other highway structures, sewers and water mains, airports and other similar public works, but not including buildings, for the Commonwealth or any agency or political subdivision thereof" has been completed to the satisfaction of the duly authorized representative of the contracting authority a final estimate of the quantity of the work and the value of such work shall be prepared. It is provided that the final estimate shall be prepared in duplicate, one copy to be submitted to the contracting authority and one copy to the contractor for acceptance. The estimate shall include the value of all work performed and all retained percentage after deducting therefrom the total of all previous periodic payments and sums sufficient to satisfy any claims or liens against the contractor or any other amounts to be deducted under the terms of the contract.

The law further provides that if there are any payment items or extra work items in dispute between the contractor and contracting authority, such items may be excluded from the final estimate and payment for such disputed items may be deferred until such time as agreement has been reached or the claim has been adjudicated. In such event a semi-final estimate shall be prepared within said period of 65 days covering the value of all completed work and all retained percentage on all items of the contract which are not in dispute, but subject to the same deductions as provided in the case of a final estimate. The bill further provides that the existence of a dispute between a contractor and the contracting authority as to any payment item or items shall not be considered a valid reason for delaying preparation of a semi-final estimate as required.

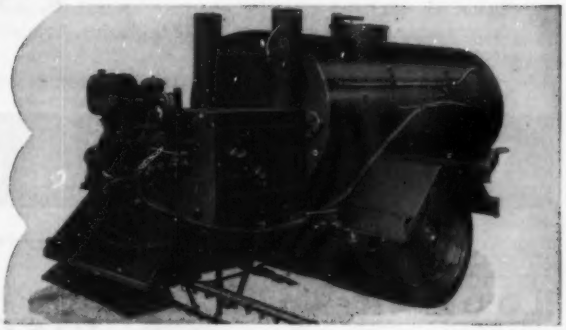
The new law also provides that in the event any contract has been substantially completed and opened to public use but final acceptance is delayed because of minor uncompleted items which do not impair the usefulness of a project, a semi-final estimate shall also be prepared within 65 days after such contract has been substantially completed or opened to public use. Such semi-final estimate shall include payment for all work performed and all retained percentage less the value of such minor items as have not been completed, and payment for such uncompleted items shall be deferred until final completion.

If the contracting authority fails to prepare any final or semi-final estimate within the period prescribed by the law, interest on the amount due the contractor shall be paid at the rate of 5% per annum, beginning on the 66th day after the contract has been satisfactorily completed or substantially completed and opened to public use, as the case may be, and running until the date such estimate is prepared and submitted to the contractor for acceptance. The final provision of the act is that such interest payment shall be included in the final estimate when it is prepared.

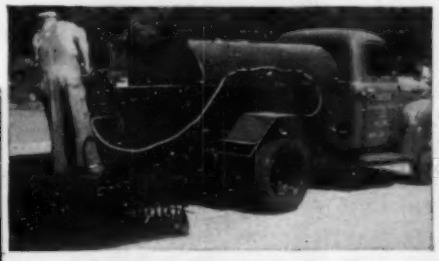
As adopted the law is far reaching and applies to all public works projects except buildings and to all such contracts entered into with the Commonwealth and all its agencies and political subdivisions, which means cities and towns.

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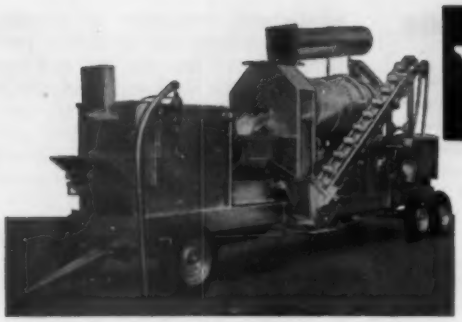
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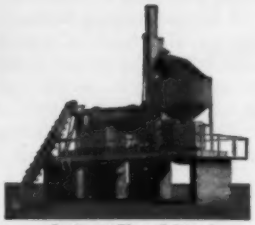
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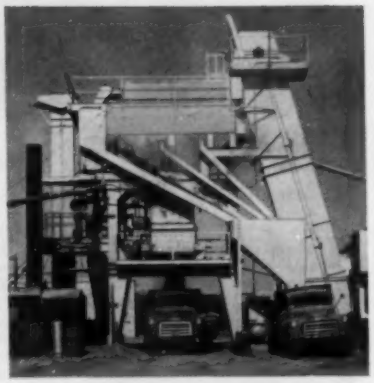
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Sufficiency rating used in Kansas road planning

The State highway network in Kansas was given a fresh sufficiency rating during the 1955 Summer through an 11-week survey to develop rating data. The information will be used in determining the 1956 construction priorities, according to Walter A. Rugan, director of highways.

This is the third year in the use of such ratings in Kansas, where the methods in general follow the AASHO design standards which prescribe higher standards for the interstate system than for other state roads. Each section is rated on a scale of 80 points by the survey parties, then the division engineer may add up to 20 points on the basis of the structural adequacy of the section. The total is then adjusted on the basis of the traffic volume being carried. A perfect rating is 100.

The 1955 survey shows a statewide gain of 5 or 6 points over the average of 64 points recorded in 1954, reflecting the large improvement program and intensive maintenance in progress in the State. The 1954 ratings showed only 500 miles of highways with 90 or better.

The highway commission's planning department, in its survey, checks the roadway and shoulders, the right-of-way, whether the drainage is adequate, alignment, passing opportunities, whether stopping sight distance is always sufficient, and other items.

The division engineer checks the work sheet, using judgment as to the difficulty of maintaining a satisfactory riding surface, how much of the original roadbed is left, etc. Earth and gravel surfaces rate zero for structural adequacy. Light-type bituminous surfaces get a few points if in good condition. New high-type surfaces receive 20 points.

• Underlying the urgency for stepped-up highway construction is the constant growth in traffic volume. Total motor vehicle travel mileage in the United States was 650 billion miles in 1954, will be 760 billion miles by 1965 or sooner according to best estimates.

Oklahoma's Governor, Raymond Gary, announces a $185 million four-year road building program during his term in office as a desirable objective for the state. He would concentrate on 160 miles of new divided 4-lane construction on the more heavily traveled routes.

Tips on avoiding tire troubles

Your big scraper and wagon tires will give less trouble and require a lot less maintenance if they are properly looked after. So reminds LeTourneau-Westinghouse Company which points out that tires kept in good running order eliminate delays, unnecessary labor, and mishaps.

Some of the hints on tire upkeep:

1. Keep checking for proper inflation. Measure air pressure every day, if on a two- or three-shift job, every other day working one shift.

2. Follow the operator's manual for pressures recommended.

3. It's best to check tires at the same time every day and under similar conditions of internal heating from tire travel. Do not bleed tires whose pressure has increased normally because of heat from friction or rising air temperature.

4. If a tire loses 5 lb. or more during 24 hours, and does this regularly, don't just reinflate, check for the cause of the loss — maybe it's a slow leak.

5. While checking pressures, clean mud and dirt from around exposed valves. Wipe off any excess oil from the tires, since oil causes rubber to rot.

6. Remember that you need lower pressures for soft ground, higher pressures for well-maintained, hard haul roads.

7. When in doubt due to variable conditions, keep on the low side in pressure. Over-inflation causes more trouble than under-inflation.

8. If the roads are rocky, it pays to cut down on the load or speed, or both. It helps avoid tire damage, helps you get through easier and move more yardage.

9. Pick out nails, glass, stones, that can cut rubber. Be alert for gashes, gaps or bulges. If cuts come close to the cords, remove tire and vulcanize it at once. Prompt action here will save a blowout or delay from a flat.

10. If a tire is worth repairing, don't put a boot in it. A boot is for the last gasp of a worn out tire.

11. If a motor grader isn't on hand for regular haul road patrol, drop the scraper pan occasionally to iron out ruts, clear the road of sharp stones and spillage. Deep ruts help wear out side walls.

12. Where units are working near rooted or blasted material, steer around the big sharp fragments.

13. Don't spin your wheels in fast starts. Don't skid to a screeching halt. In borrow pits and on the fill, start and stop sensibly. It's safer and you'll get more yardage by more careful operation.

Another Penn Turnpike Link

A 46-mile toll road across Northwestern Pennsylvania, connecting the New York State Thruway with the Ohio Turnpike, is announced by the Pennsylvania Turnpike Commission. It will roughly parallel the shoreline of Lake Erie, skirting the city of Erie. Estimated cost $62 million. Completion date late 1957.

Texas again gets Safety Council award

The Award of Honor, highest safety award given by the National Safety Council, has been presented to the Texas Highway Department for the second consecutive year, D. C. Greer, State Highway Engineer, announced in Austin.

This award is based on accident prevention achievement. To determine qualifications, the Council averaged the safety records of the Texas department and of the entire construction industry for the three previous years, then compared the Department's 1954 safety record with this average to determine the standing in reference to the other construction organizations which are members of the Safety Council. Only a relatively small percentage of member organizations are able to meet the rigorous standards to qualify for the citation.

The Safety Program of the Highway Department was originated in 1938, largely as a result of the efforts of the Insurance Division. Five trained safety instructors are kept in the field to carry out the program, assisting with safety meetings, making safety inspections, helping supervise and prepare training courses, and investigating accidents.

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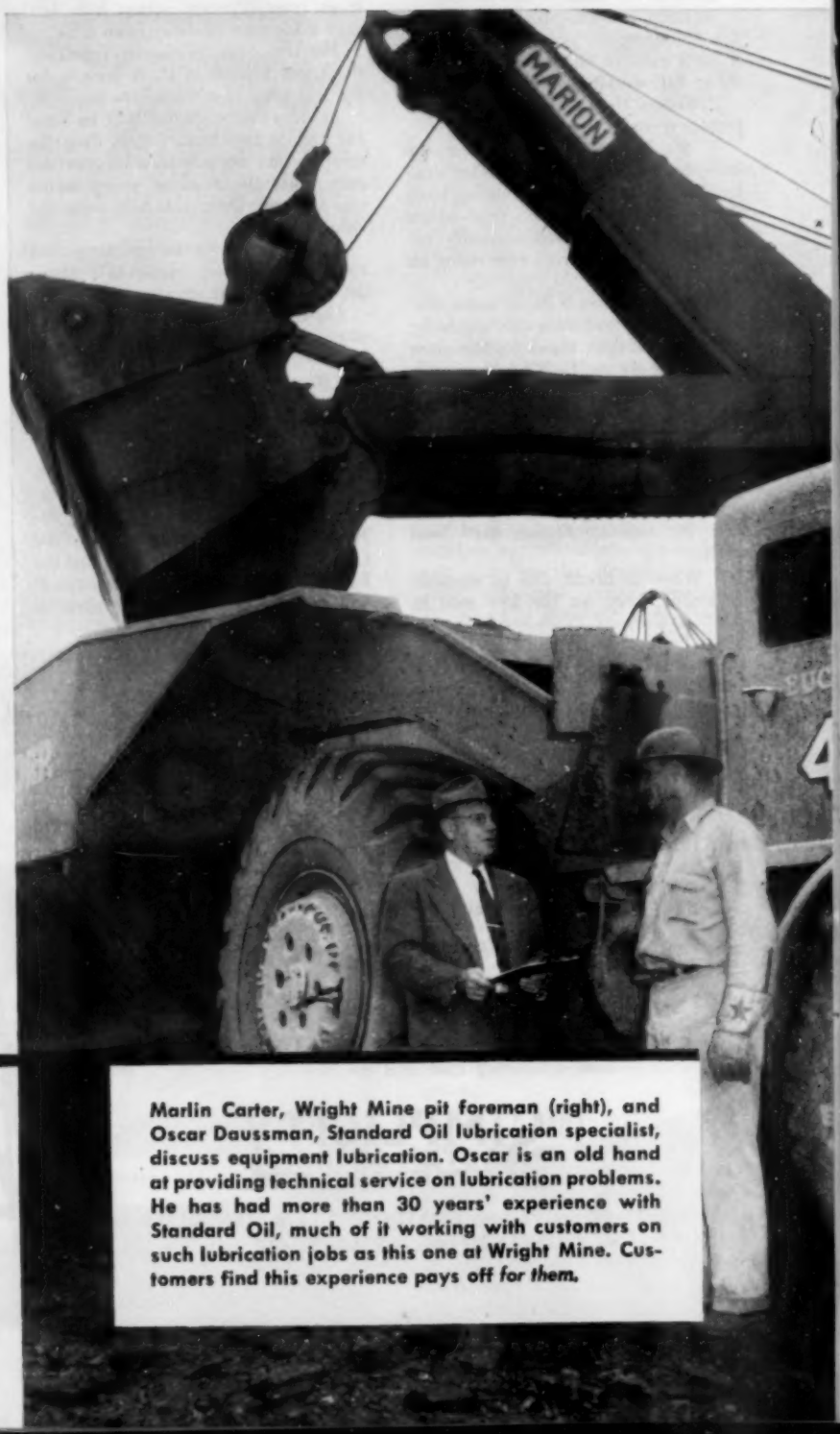
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Diesel

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- TD-18 with Heil Cable Dozer. 1949 Model. Springfield, Illinois.
- TD-18 with B.E. Hydraulic Bulldozer. 1940 Model. Rock Island, Illinois.
- TD-14 with B.E. Hydraulic Dozer. 1941 Model. Rock Island, Illinois.
- D-4 with Trackson Cable Hydraulic Loader, Morton, Illinois.
- TD-9 with Hough Loader. Springfield, Illinois.
- TD-9 with Heil Hydraulic Dozer. Springfield, Illinois.
- T-9 with Bucyrus-Erie Loader. 1950 Model. Morton, Illinois.
- HA-12 Cubic foot Payloaders. 1948 Models. Morton, Illinois.
- I.H.C. ID-6 with Hough Loader. Morton, Illinois.
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Heavy Horiz. Welded
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120-B Bucyrus-Erie Electric Shovel, 35-ft. boom, 21-ft. sticks, 5-yd. dipper. Excellent condition.

2—520 Gar Wood Scrapers, wagon struck, 20 yds. heaped.

FRANK FAMALETTE EQUIPMENT COMPANY
P.O. Box 325 Hazleton, Pa.
GL 5-1323

FOR SALE

Koehring #34 E. Dual Drum Paver #19910.
Lima #34 Paymaster Crane, Dragline #4831.
Lorain L-50 Crane, Dragline #20440.
Cat. #12 Grader #8T 3027.
Cat. #12 Grader #8T 3706.
R B Finegrader S/N #405.
Model 848 Barber-Greene Asphalt Plant Complete.
Cat. #20 KW Light Plant.
Hopkins Low Pressure Burners.

All of above equipment located in Southeast

UNITED SOUTHERN CONTRACTORS INC.
P.O. BOX 1152
GREENVILLE, SOUTH CAROLINA

FOR SALE

LATE MODELS — MIDWEST LOCATION

Two Manitowoc 3000-Bs, long booms, jibs, wide cats., diesels, erection cranes, DL&CS.

Two Bucyrus Erie Model 120-B Ward Leonard electric shovels and draglines. Late models.

Two Northwest 6's — erection cranes — DL&CS. Murphy diesels — Ind. boom hoists — wide cats. — long booms — Also 80-D backhoe attachment.

Two Model 4500 Manitowoc Draglines, Long Booms, Wide long Cats. Cat. Diesels. Also Std. Shovels.

Two Lima 2400 Std. Shovel Cats., Diesels. Wide Long Cats. 5½ yd. Dippers. Late Models.

JAMES C. FRENCH
226 Berry Pkwy. — Talcott 3-4927
PARK RIDGE, ILLINOIS

Steel Sheet Piling
125 tons Algoma B6 — 20'/40' Canada
700 tons Beth. SP4 — 20'/40' Canada
800 tons Beth. AP3, DP2 — 60' N.Y.
250 tons Beth. DP1 — 40' Conn.

20E Clyde Electric Whirley 45 Ton
100' boom — 30' Gauge — 3 Drum Hoist

New 1953 Mix & Batch Plant
400 yd. Johnson Octagon Bin, Weighers, 800 bbl. Cement Bin, Conveyors, Feeders, 3 2-yd. Tilt Mixers. All complete.

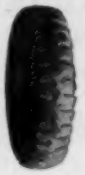
Diamond 66A Crushing Plant
10x36 Crusher — 30x18 Rolls, Vib. Screens and Conveyor.

THE DARIEN CORPORATION
60 E. 42nd St
NEW YORK 17, N.Y.

Equipment Bargains All Over The Country

3042 Buchanan jaw, never assembled, approx. $4,000 parts missing $5,700 — 8486 Allis Chalmers jaw with motor — 3' Symons std. and shorthead — A-C Sup. McCully 30" —12K Gates — 5424 Pioneer triple roll new cost $27,000 used two seasons $9,350 — 5x14 Marcy rod mill $5,750 — Three 85 ton trolley locomotives lot $23,000 — Five NEW battery locomotives & 3 sets batteries, 35.4" ga., 10 tons all for $37,000 — About 40 Koppel two-way side dump cars & 3 Plymouth gasoline locomotives all 24" ga. all for $3,500 — Differential Electric Co. haulage equipment including 4 locomotives with built-in side dump car and 17 - 130 cu. ft. air dump cars, std. ga. — Manitowoc 4500 dragline $84,000 — Joy 56 blast hole drill — 78" & 48" spiral classifiers — Cedar Rapids AA 2225 primary plant, 1953, complete $25,500.

STANLEY B. TROYER EQUIPMENT CO.
Box 97 — Crosby, Minnesota — Phone 500
List Your Surplus Equipment With Us.



FOR SALE

9.00x20 Army Combat tires and tubes, $20.00; 11:00x18 tires, tubes and wheels, $20.00; 9:00x16 tires, $15.00.

RECONDITIONED

Boom Assy. w/winch for Holmes Wrecker, Capacity 4,000 lbs., price each	$ 600
6x6 G.M.C. trucks (65 trucks)	1,500
*6x6 Dodge, 1½ ton trucks, without winch	595
*6x6 Dodge, 1½ ton trucks, w/winch	695
6x6 Biederman, 7½ ton trucks	2,000
6x6 Reo, 7½ ton trucks	2,000
4x4 Chev. cargo, body & winch	750
4x4 Chev. tractors	550
4x4 Dodge weapons carriers	545
4x4 Autocar, 5 ton trucks	1,000
4x4 Federals, 5 ton trucks	1,000
4x2 Ford, Cab & Chassis (100 trucks)	300
4x4 Scout cars with 9:00x20 combat tires	800
47 passenger Diesel Yellow Coach, perfect condition, like new	3,500
G.M.C. amphibious trucks (Dukw)	700
2000 gallon tank trailer	650
30 foot flat trailer	1,000
28 foot tandem van trailer	1,500
C-2 Wrecker on Federal truck	5,000
100 Lowboy Semi trailers, 3½ ton	250

We have parts for above vehicles. Tarps, 17x40, $50 each; tarps, 17x20, $25 each, like new. New C.H. Fink snow plow, model 349SP; large & small fork lifts; large & small winches; 40 generator sets, 4 cyl, gas engine, 15KW DC, 28.5V, 2 wire, 2400 rpm, portable, model C-16.

(*122 Trucks)
All material is F.O.B. Chambersburg.
25% WITH ORDER — BALANCE C.O.D.

H. B. SLAUGHENHAUP
PENNSYLVANIA'S LARGEST DEALER OF ARMY SURPLUS & VEHICLES
Lincoln Way West - Chambersburg, Pa.

FOR SALE or RENT

2 — 100 HP Lucey portable horiz. firebox boilers. 200 lbs. Oil fired. ASME Code.

2 — Jaeger 3-drum Hoists, 100 H.P. Continental Gas Engine 10,000# SLP. NEW.

1¼ yard Manitowoc 2000-B crane, Cat D13000 eng. 70' boom.

25 ton Orton Locomotive Crane. Cat Diesel. New 1942. Air Controls.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. St. Louis 1, Mo.

ASPHALT PAVING EQUIPMENT

One 1,090 Gallon Emyre Asphalt Distributor mounted on Big Reo Truck.
One No. 6 to 8 Ton Galion Roller.
One Case Tractor with power broom mounted on front.
One 2,000 Gal. Asph. Transport.
One 33 Ft. Barber-Greene Belt Conveyor.
One under track Barber-Greene material unloader.
One 10 Ft. Good Roads spreader box.

This equipment is all like new, ready to go.

HENSLEY & SON
Asphalt Paving Contractors
5723 Haddesty Kansas City, Mo.

FOR SALE OR RENT — EASY TERMS
Rebuilt — A-1 Condition
48B Bucyrus Erie Shovel 2 cy Diesel
Caterpillar Auto Patrol No. 12
Caterpillar D8 Bulldozer
Caterpillar Scraper Model 80
3—Caterpillar DW 10's
WILLIAMS CONSTRUCTION COMPANY
Box 145, Balto 20, Md. Murdock 6-6600

EQUIPMENT PRICED FOR QUICK SALE

1—Buckeye Hi-Way Widener Mod. 616-45 with 24", 30", 36" and 48" buckets, G.M. Diesel Eng. Mod. 371, 1½ yr. old.

1—Austin-Western Grader Model 99-H, Ser. No. H3584, International Diesel Eng. Mod. UD 14A, Ser. 28179, fully equipped.

1—Lima No. 34 Paymaster Shovel, Ser. 2322, with G.M. Diesel Eng. Mod. 371; ¾ C.Y. Shovel Front, ¾ pull shovel attachment, 35' Crane Boom with fair leads.

1—Apsco Widener, Model 95, Ser. No. 203, 1 yr. old.

9—G.E. 60 Watt two way mobile radio stations and

2—G.E. 30 Watt two way radio base stations.

BLACK TOP PAVING COMPANY, INC.

9 East Beau St. Washington, Pa. Telephone: Washington 9305

TESTING SERVICE CORPORATION
TESTING ENGINEERS
ENGINEERING GEOLOGISTS

Foundation Investigations — Laboratory analyses and Evaluation of Construction Materials — Soil Mechanics, Concrete and Asphalt Technology. Field Inspection and Consultation. Special Investigations for Dams, Turnpikes and Airports.

710 North Brookfield South Bend 28, Indiana

ARCHITECTURAL, CIVIL, MECHANICAL ENGINEERS — Interested in design and development of products and equipment for building and highway construction field — minimum of three years experience in construction or allied manufacturing field preferred. Work consists of design of products and related equipment and some laboratory and field work in conjunction with this design. Salary open — excellent working conditions.

Please submit work history and qualifications to:

Personnel Director
Granco Steel Products Company
6506 North Broadway
ST. LOUIS 15, MISSOURI

SALE – RENT
Rental Purchase

Cranes — Draglines — Shovels
2—Lorain 50-K, Crane, Dragline Shovel.

Euclids — Bargains
24—15 yd. Bottom Dumps, Cummins GM and Buda Engines.

Dumpsters
2—Model 60-W Koehring Dumpsters.

Buckets
¾ to 4 yd. dragline buckets
¾ to 1½ yd. clamshell buckets
½ to 2 yd. concrete buckets

Steam Generator
Littleford Model 3500

Finishing Machine — Asphalt
Barber-Greene S/H 879-4-72

Pumps
1½" to 6" centrifugal
4" jet Gorman-Rupp
6" jet Peerless 3-stage
3" to 4" Diaphragm

Hoists
Clyde & American, 1, 2 & 3 drum

Air Tools
Wagon drills, jack hammers, air hoists, tampers, paving breakers, riveting tools, woodborers, impact wrenches, concrete vibrators.

Saws
20" band, Skil, radial, DeWalt, table, Skil—hand, C-P (air), chain. Wright (air) chain.

Miscellaneous
Pneumatic Rollers.
Jeep Ditcher
Williams Auger, 20 ft. truck mounted
Sullivan Shalesaw
Sullivan Wagon Drill.

TEXAS CONSTRUCTION CO.

1201 Main St. Dallas, Texas
Phone AD 5-7134 E. R. Funk

LOOK HERE!!!!
MORE FOR YOUR DOLLAR

EARTHMOVING EQUIPMENT

TD-24 International Tractor, complete reconditioned. 95% track assembly.	$ 6,000.00
Caterpillar D-8 with Cat. Dozer and two drum power control unit, excellent condition	6,850.00
Two DW-21 Caterpillar Motor Scrapers, good rubber, excellent mechanical condition, each	16,500.00
Six Model 9FDT Euclids with 58W bottom dump wagons, excellent rubber and mechanical condition. Each	5,000.00
Three LeTourneau, Model FU, 19-22 yard scrapers, excellent rubber and condition. Each	2,750.00
Woolridge, 11-14 yard scraper, good condition.	

SHOVEL, DRAGLINES, ETC.

P & H Model 855B, Shovel-Dragline Combination, powered by GM diesel, standard shovel front, 80' boom and 2 yard dragline bucket. This machine was new in 1949 and has been used only intermittently. Absolutely A-1 condition. Price	22,500.00
Northwest, Model 25, ¾ yard dragline, 50' boom, powered by Cat. diesel, excellent condition	7,250.00
Can supply a shovel attachment for additional $1,250.00.	
Insley, Model L, ¾ yard backhoe, just two years old, thoroughly reconditioned. Price,	7,500.00

DITCHERS

Parsons, Model 22I, ladder-type ditcher, powered by Waukesha gasoline engine, used one season, new condition. Price	7,500.00
Cleveland, Model 95, wheel-type ditcher, powered by Buda gasoline engine, rebuilt. Price is	4,250.00
Barber-Greene, Model 44C ditcher, good operating condition	3,500.00

MISCELLANEOUS

Brand new parts for Lima 1201 and P &H model 1055B at 40% of new cost.	
Superior Side-Boom for International TD-18. A-1 condition,	900.00
Barber-Greene, model 82 bucket loader. Buda gasoline power, good operating condition	1,750.00
Pettibone Mulliken 3 yard dragline bucket, good condition,	350.00
Caterpillar D-8 Push Block, unused...	150.00
TD-18 Push Block, very good condition,	100.00
Northwest ¾ yard shovel attachment, very good,	1,250.00
Unit ¾ yard shovel attachment, used three months, A-1 condition,	950.00

TRI-CITY EQUIPMENT CO.

8104 Prospect Ave.—Phone: DElmar 7078
Kansas City, Missouri

TRUCKS WANTED

Highest dollar value paid for new and used trucks and all kinds of used equipment. All types of truck equipment bought and sold, including war surplus. Write, phone or wire:

BILL FISHEL
VANDEVENTER AUTO SALES
717 So. Vandeventer Ave., St. Louis, Mo.
PHONE FRANKLIN 1-1750

Bucyrus-Erie Model 15-B, ½ yard shovel, crane and dragline combination including drum lagging and tagline reel. In excellent condition. Available immediately.

MODEL 15-B BUCYRUS-ERIE ½ yard CRANE-DRAGLINE COMBINATION — Long frames, wide crawlers, Diesel power — very good condition — Price at Job site $10,950

MODEL J QUICKWAY SHOVEL - HOE COMBINATION — truck mounted, very good condition—F.O.B. Job Site $3,000

BUCYRUS - ERIE H-2 HYDRO - CRANE, mounted on Chevrolet truck — Price reduced for quick sale $2,750

3/8 yard Blaw Knox CLAMSHELL BUCKET, very good condition $500

3/8 yard Erie strayer CLAMSHELL BUCKET, very good condition $450

SUBJECT TO PRIOR SALE
TERMS — TRADE
Call or Write

J. P. WAITE CONSTRUCTION CO.

3308 West Pierce St.
Milwaukee 15, Wisconsin
PHONE EVergreen 4-1900

Construction-Excavating, established 18 years, Montana. Grossing about $100,000 annually with high net profit. Equipment in tip top condition. Sand and gravel pit go with business. Health forces sale; your opportunity to buy a real money maker.

C-5066 Continental
804 Grand
KANSAS CITY, MISSOURI

With the Manufacturers and Distributors

GRM Now in Production

General Road Machines, Inc., Niles, O., organized a few months ago by Don Heltzel, Jack Marcello and Michael Hurdis, began manufacturing operations on April 1, and has already produced six new products. These include subgraders, automatic curing machines, mechanical curb builders, compacting screed finishers, road and airport forms and final finishers.

It is announced that before the end of the present roadbuilding season, the company will introduce a subgrade testing machine, concrete spreaders, joint machines, cap strips and rolling and power bridges. By early 1956, a full line of bins and batching plants will be available.

GRM's sales organization is arranging for an international force of construction equipment distributors. Included among those already appointed are: Gil Boers Equipment Co., 7625 S. Kedzie Ave., Chicago 29, Ill.; R. G. Moeller Co., 14415 Meyers Road, Detroit 27, Mich.; Frank McCaffery Equip. Co., 10702 Broadway, Cleveland 25, O.; Stephens Equipment Co., 818 S. W. Ninth St., Des Moines, Ia.; Hennessey-Forrestal Mach. Co., 705 Chestnut St., St. Louis, Mo.; Ray Long Equipment, Inc., 820 Blossom St., Columbia, S. C.

CLEVELAND TRENCHER APPOINTMENTS. The Cleveland Trencher Company, Cleveland, O., has announced the promotion of E. B. Volmar to vice president in charge of manufacturing and the appointments of Clifford P. Morgan as sales manager and David L. Raymond as chief engineer.

BUTLER MACHINERY NEW PIONEER DISTRIBUTOR. Butler Machinery Co., 610 13th St., North, Fargo, N. Dak., has been appointed distributor for state of North Dakota of Continuflo line of equipment of Pioneer Engineering Works, Inc., Minneapolis, Minn., a subsidiary of Poor and Co., Chicago.

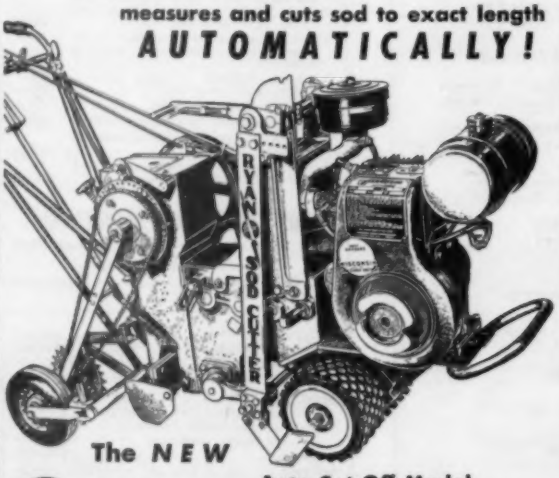
NEW DISTRIBUTOR FOR LINK-BELT SPEEDER. Link-Belt Speeder Corporation, Cedar Rapids, Ia., has appointed the newly organized McAllister Equipment Co., 1615 N. Mannheim Road, Melrose Park, Ill. as distributor for its complete line of crawler and rubber-tired shovel-cranes. The new firm is headed by E. C. McAllister, former vice-president and sales manager of Patten Tractor & Equipment Co., Bellwood, Ill. The McAllister territory for Link-Belt Speeder will include the Illinois counties of DeKalb, LaSalle, Grundy, Kendall, Kane, Winnebago, Boone, Carroll, Ogle, Lee, Bureau, McHenry, Lake, Cook, DuPage, Will Kankakee, Joe Daviess and Stephenson. It will also include Lake and Porter counties in northwestern Indiana.

NEW CHAIN BELT DISTRIBUTOR. Pioneer Equipment of Nevada, Inc., Reno, Nev., has been appointed exclusive distributor for Rex construction machinery equipment of Chain Belt Co., Milwaukee, Wis., for the state of Nevada except for White Pine, Elko and Clark Counties. Pioneer Equipment Co. of Nevada also shares distribution in the following California counties: Alpine, El Dorado, Placer, Nevada, Sierra, Plumas, and Lassen.

WOOD NAMED CATAPHOTE SALES MANAGER. R. B. Wood has been appointed sales manager of Cataphote Corporation, Toledo, O. He had been in an executive sales capacity with Eagle Crusher Co., Galion, O., for nearly 10 years.

VASCOLOY APPOINTS A. D. LILLSTROM R. O. Moore, general sales manager of Mining Tools, Vascoloy-Ramet Corporation, Waukegan, Ill. has announced the appointment of Arnold O. Lillstrom as field supervisor for metallic, non-metallic and contractors mining tools. Mr. Lillstrom is well known in mining circles, having spent some 19 years in the hard-rock mining industry.

measures and cuts sod to exact length
AUTOMATICALLY!



The NEW
Auto-Cut-Off Model
Ryan POWER SOD CUTTER
cuts 15 sq. yds. of sod per minute
(and cross cuts in the same operation!)

Here is, beyond doubt, the finest sod cutter ever built. The new Auto-Cut-Off model completely eliminates hand cross-cutting, gives you better quality sod with precision, square-cut ends for easier laying — greater profits. Easily cuts 15 sq. yds. a minute. Available in several sizes.

For complete information, write Dept. K-6 . . .

Ryan landscaping equipment company
Quality Built
Division of FMC Machine Works, Inc.
871 Edgerton St.
St. Paul 1, Minn.

down by the seashore
TATEM Surf Club

Carefree living enhanced by . . . large, cheerful guest rooms . . . private pool, ocean beach, cabana club . . . dining room and cocktail lounge.

Rates from $8 double, European Plan.

SELECTED CLIENTELE

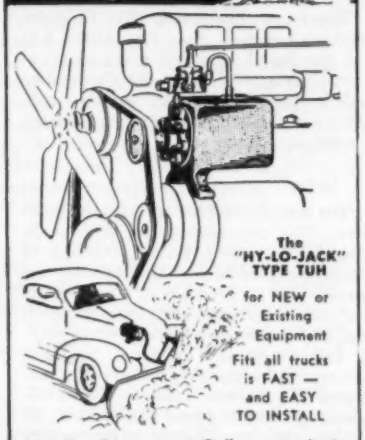


Write for Booklet

On the Ocean at 43rd Street MIAMI BEACH

. . . for more details circle 241, page 14

Plenty of LIFT!
with
MONARCH
POWER
HYDRAULICS
for Snow Plows and
Road Machinery



1000 lbs. Pressure - 1 Gallon per minute volume. Fan Belt driven. Electric models (6 or 12 volt) also available.

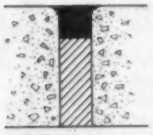
MONARCH ROAD MACHINERY CO.
1331 MICHIGAN ST. N.E.
GRAND RAPIDS 1 MICH.

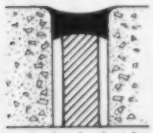
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Stop
JOINT
SEAL
FAILURES
USE
HOT POURED
PARA-PLASTIC



• Keeps joint sealed under severest conditions of traffic, temperature
• May be pumped directly into joint from melting kettle


Resists bumps in warm weather


Maintains bond in sub-zero temperatures

Nothing equals the joint sealing performance and protection of Servicised Para-Plastic. Stable, constant in volume, Para-Plastic is a rubberized asphalt compound that maintains bond at normal and sub-zero temperatures. Field proven — widely used, it's the most effective joint seal on the market.

Write for details on Para-Plastic and simple, low cost application method.

SERVICISED PRODUCTS CORPORATION
6051 W. 65th ST., CHICAGO 38, ILL.

. . . for more details circle 242, page 14

BROWN PROMOTED BY GAR WOOD. Leo M. Brown has been promoted to the position of manager of the Chicago district factory sales branch of Gar Wood Industries, Inc., Wayne, Mich.

NEW DISTRIBUTOR FOR GALION ALLSTEEL. Maimi Valley Truck Body & Equipment Co., 1926 Home Ave., Dayton, O. has been appointed distributor by Galion Allsteel Body Co., Galion, O. for its dump bodies and hoists. The territory is west central Ohio.

GOWING FILLS NEW ESCO POST. The Electric Steel Foundry Co. has appointed Harold M. Gowing manager of the Public Relations Department, a newly created department of the company. His office will be at the main office and plant in Portland, Ore.

NEW DISTRIBUTOR FOR LETOURNEAU-WESTINGHOUSE. Ferguson-Blackmore Machinery Co., 9025 G St., East Oakland, Calif. has been named distributor for the complete line of LeTourneau-Westinghouse Co. equipment including motor graders and TraveLoaders manufactured by its Adams Division.

MITTELSTADT APPOINTED CHIEF ENGINEER. C. F. Mittelstadt has been appointed chief engineer of The Heltzel Steel Form & Iron Co. and its wholly owned subsidiary, The Flexible Road Joint Co., both of Warren, O.

HOPSON NAMED HYSTER EXPORT REPRESENTATIVE. Donald H. Hopson, heretofore with the export division headquarters at Peoria, Ill. has been appointed export field representative for Hyster Co., Portland, Ore. He will cover Venezuela and Colombia.

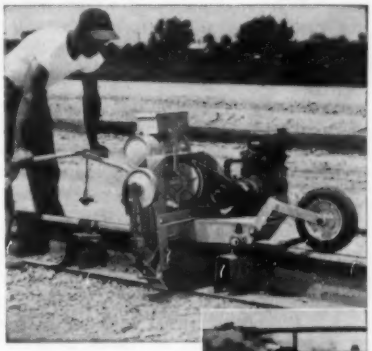
NEW CLEAVER-BROOKS DISTRIBUTOR. Cleaver-Brooks Co., Milwaukee, Wis., has appointed Barrett & Yost Co., 5600 15th Ave., N.W., Seattle, Wash. as manufacturers' representative for its boilers and equipment.

ANGELL APPOINTED DISTRICT SALES MANAGER. The Construction Machinery Division of Chain Belt Co., Milwaukee, Wis. has announced the appointment of Charles R. Angell, Jr. as western district sales manager with offices in San Francisco.

JENKINS NAMED SALES MANAGER. Joseph J. Jenkins has been appointed sales manager, Industrial Division, Lincoln Engineering Co., St. Louis, Mo. He has been with the company for 15 years.

FLASKAMPER VICE-PRESIDENT. John H. Flaskamper, formerly manager of fuel injection sales, has been advanced to the position of vice-president-sales of American Bosch Division, American Bosch ARMA Corporation, Springfield, Mass.

TAMPS 25 FEET PER MINUTE!





Contractors Save Time And Money On Ohio Turnpike with "Form Tampers"

In just a few hours one man with a FORM TAMPER can tamp and oil the forms for the full day's run! And the FORM TAMPER does a better, more uniform job of tamping than can be done by hand. Result: a smoother concrete surface at lower cost—in less time.

SEND COUPON NOW FOR INFORMATION ON . . .
• FORM TAMPERS
• FORMGRADERS
• TRAIL GRADERS
• STRAIGHT EDGES
• SUBGRADE SCRATCH TEMPLATES

THE CLEVELAND FORMGRADER COMPANY
Mills Road, Avon, Ohio
☐ Send literature to:
Name
Firm
Street Address
City Zone State

. . . for more details circle 193, page 14

Road Machinery Featured in GM Powerama Show at Chicago

One of the most spectacular and informative exhibits of construction and roadbuilding machinery ever assembled for the general public is a feature of General Motors' 26-day Powerama which continues in Chicago through September 25.

The event, a virtual world's fair of power, marks General Motors over-all production of 100 million diesel horsepower. The theme is "Power For the Wheels of Progress." Exhibits showing how this power has been put to work, and the important role of diesel power in American industry, covers a 23-acre site near Soldier's Field on Chicago's waterfront. The show is free to the public.

The roadbuilding exhibit arranged by GM's Detroit Diesel Engine Division centers about a section of "highway" in various stages of construction. Practically every type of equipment used today in the building of American roads is displayed at stations ranging from rough terrain to finished concrete and asphalt surfaces. Included in the display are shovels, earthmoving, drilling, grading, loading, ditching, compacting, mixing and paving equipment.

Another Detroit Diesel exhibit of particular interest to the construction industry in general will be a carrousel on which easily identifiable scale models of roadbuilding and construction equipment are displayed. Since it was impossible to show actual "live" models of all equipment on which GM Diesel power is offered, this spectacular display, 30 ft. in diameter, is Detroit Diesel's salute to manufacturers using GM Diesel power in their products. As these models are constantly rotating on a turntable each receives equal visability. In the center of the carrousel a Detroit Diesel "Series 71" gold-plated engine represents GM's 100,000,000th horsepower engine.



● Sketch depicting line-up of construction machinery along the roadbuilding exhibit at Powerama, General Motors' huge outdoor show in Chicago.

HOMELITE PURCHASED BY TEXTRON. Textron American, Inc., Providence, R.I., has purchased Homelite Corporation, Port Chester, N.Y. Homelite Corporation will be an independently operated subsidiary without change in management, personnel or policy.

THOMAS APPOINTED TO GOVERNMENT POST. The appointment of William H. Thomas, Allentown, Penna., Manager of Government Sales for Air Products, Incorporated, as Director of the General Industrial Equipment Division, Business and Defense Services Administration, U. S. Department of Commerce, has been announced by the Department of Commerce. Mr. Thomas succeeds Everett O. Clark, of Birmingham, Mich. Like his predecessor, Mr. Thomas is on loan to BDSA from his company under a rotation system whereby outstanding businessmen volunteer their services for periods of six months or longer without compensation from the government.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?

Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

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Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

ROADS AND STREETS
22 WEST MAPLE STREET, CHICAGO 10, ILL.

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☐ I do receive ROADS & STREETS and wish to continue to receive it.
☐ I do not receive ROADS & STREETS but would like to have it.

NAME

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FIRM NAME OR GOVERNMENT DEPARTMENT (give street address)

CITY ZONE (if any) STATE
(If you have moved give *old and new* address)

SIGNATURE

LIEFELD APPOINTED SALES REPRESENTATIVE. Paul T. Liefeld has been appointed sales representative for 11 western states for Rheem-beam guard rail of U. S. Spring & Bumper Co. Automotive Division, Rheem Manufacturing Co.

YOUNGERMAN APPOINTED PURCHASING AGENT. Daniel J. Youngerman has been appointed purchasing agent of the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich.

JOHANSON NEW REPRESENTATIVE FOR CARLISLE. Vern E. Johanson is the new sales representative for Carlisle Chemical Works, Inc., Reading, O., in the southwestern territory. Vern's appointment provides additional sales-service in the area for Pave, the bonding additive for asphalt cement, cutbacks, and emulsions. Johanson formerly represented Darling and Co. in a similar capacity.

CATAPHOTE CORPORATION MOVES. Cataphote Corporation, Toledo, O., has purchased an office and factory building at 2505 Albion St. and has moved from the Wall St. quarters they have occupied since 1934.

GALE APPOINTED DIRECTOR OF ADVERTISING. Richard H. Gale, formerly production manager of Eaton Mfg. Co., Cleveland, O., has been appointed to a newly created position by director of advertising. In this position he will supervise Eaton's advertising, sales promotion and publicity activities.

NEW CLARK EQUIPMENT CO. DISTRIBUTOR. Harlan C. McKay Co., 2950 S. W. Vista Drive, Portland, Ore. has been appointed to sell and service Clark Equipment Co., Buchanan, Mich. complete automotive line of axles, transmissions torque converters and packaged power trains in Idaho, Oregon, Washington, British Columbia and Alaska.

KEYSTONE ASPHALT APPOINTMENTS. Jack Simpson has joined the Chicago office of Keystone Asphalt Products Co. as inside salesman. G. W. Norcross has been appointed research engineer at the Chicago Heights plant of Keystone Asphalt Products Co.

NEW HEIL DISTRIBUTOR. Alabama Truck Equipment Co., 1730 Vanderbilt Road, Birmingham, Ala., has been appointed as a distributor of Heil dump bodies and hydraulic hoists, Colecto-Pak and Colectomatic garbage and refuse units and Heiloader elevating truck tailgates.

BRADFORD APPOINTED BUCK REPRESENTATIVE. The Buck Equipment Corporation, Cincinnati, O., has appointed S. S. Bradford as an authorized Buck representative in Cincinnati, O.; Dayton, O.; Louisville, Ky.; Chicago, Ill., and all of the state of Indiana. He is authorized to sell all models of Buck hoisting machines, both the trailer-mounted models and the new "Pelican" truck-mounted units.

NAPCO INDUSTRIES APPOINTMENTS. Roger B. Huffman and William Delaney have been appointed to key positions in the Construction Equipment Division of Napco Industries, Inc., Minneapolis. Huffman, formerly chief engineer of the Knickerbocker Co., Jackson, Mich. will be chief engineer on the line of Napco self-contained front end loaders. Delaney, who was service manager for U. S. Thermo Control and the Baker-Lull Corp., Minneapolis, holds the same position with Napco.

NEW BUFFALO-SPRINGFIELD DISTRIBUTOR. Machinery, Inc., Charleston, W. Va., has been appointed distributor for the complete line of road roller and compaction equipment manufactured by the Buffalo-Springfield Roller Co., Springfield, O.

KOEHRING PROMOTES BURTON. R. E. Burton has been appointed assistant general sales manager of the Koehring Co., Milwaukee, Wis. He succeeds M. O. Messenger, recently appointed vice-president and sales manager for Koehring's Canadian subsidiary, Koehring-Waterous Ltd., Brantford, Ont.

"QUICK-WAY" SHOVEL APPOINTMENTS. Kenneth O. Williamson has been appointed assistant general sales manager of "Quick-Way" Truck Shovel Co., Denver, Colo. Daniel S. Heffron has been promoted to the position of director of domestic and export sales.

NEW DISTRIBUTORS FOR MAGINNISS. Appointment of several new distributors has been announced by the Maginniss Power Tool Co., Mansfield, O.: Herman M. Brown Co., 1st & Sheridan Sts., Des Moines, Iowa for the state of Iowa; Midstate Massena, Inc., 34 Center St., Massena, N.Y. for northern New York; Contractors' Equipment Co., 1212 Wolf St., Syracuse, N.Y. for central New York; West Coast Engine and Equipment Co., 1077 Eastshore Highway, Berkeley, Calif., for central and northern California. Two affiliates of West Coast Engine and Equipment Co. will also handle the Maginnis line. They are Island Equipment Co., 7200 Freeport Blvd., Sacramento, Calif., and Equipment Sales and Service Co., 821 S. Wilson Way, Stockton, Calif.

LESCHEN APPOINTS PETERSON SALES REPRESENTATIVE. Ted W. Peterson has been appointed district sales representative for Leschen Wire Rope Division, H. K. Porter Co., Inc. His territory covers Minnesota, Wisconsin, eastern Iowa, North Dakota, and the upper peninsula of Michigan.





. . . for more details circle 238, page 14

INDEX TO ADVERTISERS

Adams Division, LeTourneau Westinghouse Co. 97
Allied Tire Sales 158
Allis-Chalmers, Tractor Division 30-31
American Bitumuls & Asphalt Co. 131
American Bosch Div., American Bosch Arma Corp. 64
Anderson Equipment Company 160
Atkinson Co., Guy F. 154
*Austin-Western Company 68-69

Ballenger Paving Company 160
*Barber-Greene 136
Barnes Manufacturing Company 119
Baron Tire Company 153
Barry, Howard T. 160
Bell Co., Inc., James W. 156
Bethlehem Steel Company 3
Black Top Paving Company, Inc. 163
*Blaw-Knox Company 112
Blue Grass Minerals, Inc. 153
Bode-Finn Co. 156
Bucyrus-Erie 15
*Buffalo Springfield 32
*Butler Bin Company 13

C.H.&L. Machinery Co. 153
Caterpillar Tractor Co. ..... 45-46-47-48, 3rd Cover
Central Engineering & Contracting Corporation 157
Chevrolet Division, General Motors Corp. 95
*Clark Equipment Company, Construction Machinery Div. 34-35
Clayton Manufacturing Company 116
Cleaver-Brooks, Heater Sales Division 111
Cleveland Formgrader Company, The 165
Cleveland Trencher Company, The 116
Clipper Manufacturing Co. 105
*Colorado Fuel & Iron Corporation, The 28
Continental Business Buyers & Associates 163
Contractors Machinery Co. 156
Courchesne, Inc., A. 160
*Cummer & Son Co., The F. D. 143

Darien Corporation, The 162
Davey Compressor Company 128
Dawson Company, C. H. 160
Deatherage & Son, Geo. E. 161
Dietz Co., R. E. 4
Dotmar Industries 120
Dow Chemical Company 89

Eighmy Equipment Company 156
Equipment Corporation of America 160
Euclid Div., General Motors Corp. 52-53

Famalette Equipment Company, Frank 162
Fayette Manufacturing Company 63
Ferrera & Company, Rocco 153
Fine Builders Realty Co., Inc. 159
*Flexible Road Joint Machinery Co., The 90-91
*Flintkote Company, The 115
Ford Motor Company, Tractor and Implement Div. 73
French, James C. 155-162
Frink Sno-Plows, Inc. 124
Frink Sno-Plows of Canada, Ltd. 124

Galion Allsteel Body Company 80
*Galion Iron Works & Mfg. Company 29
*Gar Wood Industries, Inc. 96
General Motors Corp., Chevrolet Div. 95
General Motors Corp., Euclid Division 52-53
General Motors Corp., Hyatt Division 18
Gibson & Roberts, Inc. 160
Gilson Screen Company 110
Goodman, Al J. 153-155-158-161
Goodrich Co., The B. F. 23
Goodyear, Truck Tire Dept. 5
Granco Steel Products 163
Gulf Oil Corporation 33

*Harnischfeger Corporation ..... 2nd Cover
Head & Guild 160
Hendricks Brothers 155
Hensely & Son 162
Hercules Motors Corporation 123
Horn Co., Inc., A. C. 107
*Huber-Warco Company 49
Hudson Company, A. E. 157
Hunt Steel Company, Ltd. 156
Hyatt Division, General Motors Corp. 18

*International Harvester Co. 10-11
International Harvester Co., Fargo, North Dakota 158
Illinois Road Equipment Co. 156
International Salt Co., Inc. 27
Iowa Manufacturing Company 101

*Jackson Vibrators Inc. 147
Jaeger Machine Company, The 110
Johnson Company, C. S. 24-25

Kennedy, Inc., D. D. 161
Koehring Company 24-25
Koepke, Vic 154
Krider Equipment Co., Inc. 158
Kwik-Mix Company 24-25

*LaCrosse Trailer Corp. 127
*LeRoi Div., Westinghouse Air Brake Co. 57
Leshen Wire Rope Division, H. K. Porter Company, Inc. 36
LeTourneau-Westinghouse Company 12
*Littleford Bros., Inc. 142, 146

McConnaughay, K. E. 132
Mack Trucks 106
Madsen Works 150
Marsolino Construction Company 154
Miller, Inc., Eldon 153
Min-A-Con Equipment Company 156
Minar On Central 155
Mississippi Valley Equipment Co. 159, 162
Monaco Motel 167
Monarch Road Machinery 165
Montgomery Engineering Company 158
Mueller, George 157

*Naugatuck Chemical Div., United States Rubber Co. 141
Nebraska Machinery Company 154
North Jersey Equipment Company 161
Northwest Engineering Company 77

O'Brien Machinery Co., The 158
Olson Company, Walter J. 159
Onan & Sons Inc., D. W. 120
*Owen Bucket Co., The 6

Panama Canal Company 159
Parson Company 24-25
Penn Machinery Co., Inc., H. O. 158
Pershing, H. E. 156
Pettibone Wood Mfg. Co. 8
Pfotzer, E. & E. J. 160
Pittsburgher Hotel 100
Potash, Alexander 154
Presstite Engineering Company 76

Quinn Wire & Iron Works 167

Rhian, A. J. 159
Roebling's Sons Corporation, John A. 9, 21
*Rogers Bros. Corp. 122
Ruffridge-Johnson Equipment Co. 162
Ryan Landscaping Equipment Co. 164

*Servicised Products Corporation 165
Shook, Charles H. 155
Simplicity System Company, The 151
Sinclair Refining Company 7
Slaughenhaup, H. B. 162
Smiley Steel Co., W. B. 157
Smith, Gordon W. 161
Southern Tire Company 26
Southwest Welding & Mfg. Co. 22
Speitzer Inc. 155
Standard Oil Company (Indiana) 152
Standard Steel Corporation 156
Standard Steel Works 149
Stanhope Inc., R. C. 161
Suburban Equipment Company 157
Swabb Equipment Co., Frank 154, 161
Swenson Spreader & Mfg. Co. 148

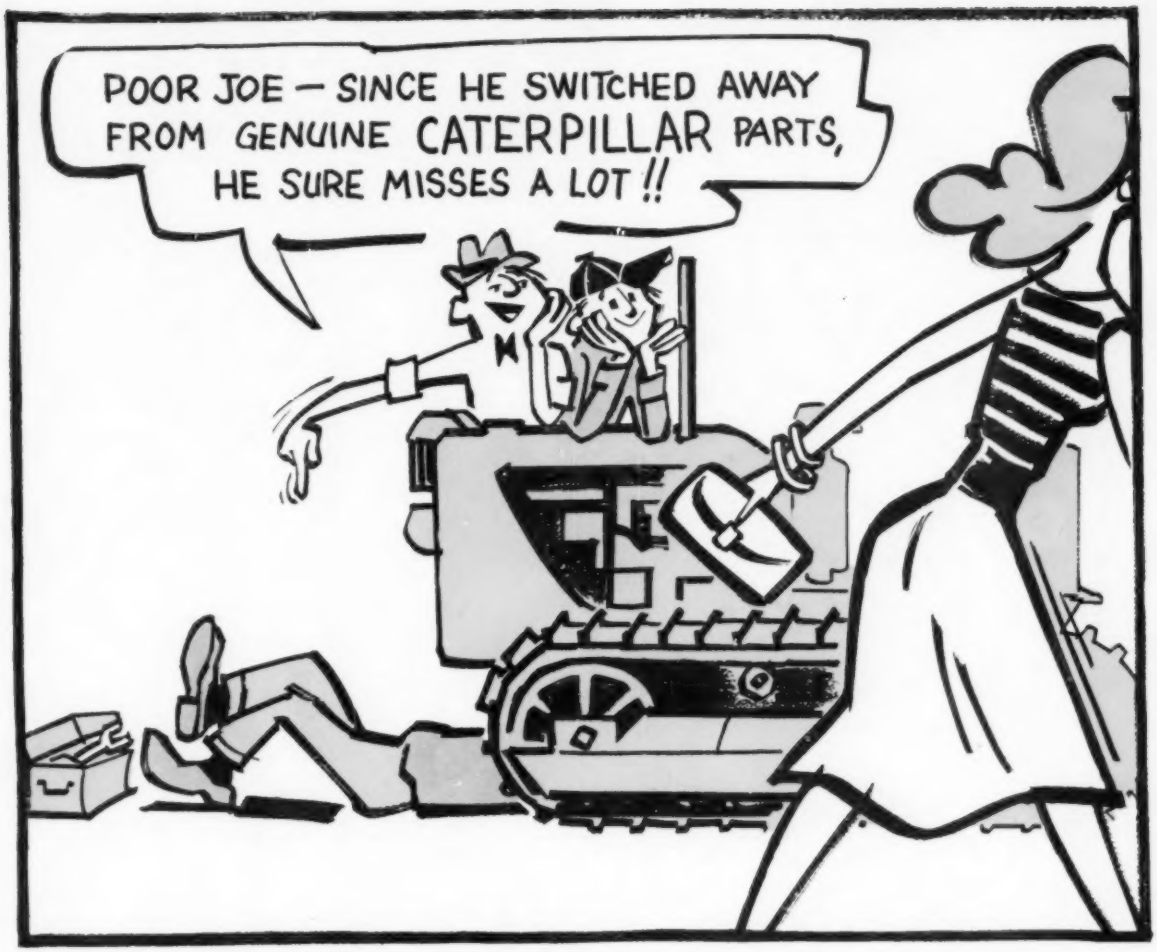
Tatem Surf Club 164
Taylor Equipment Company, Sam 154
Testing Service Corporation 163
Texas Company, The ..... 4th Cover
Texas Construction Co. 163
Thew Shovel Co., The 113
Thorp Finance Corporation 153
Thurman Machine Company, The 117
Timken-Detroit Axle Div., Rockwell Spring and Axle Co. 16-17
*Timken Roller Bearing Company ..... 1st Cover
Trachsel, Franz 159
Tractor & Equipment Co. 158
Tri-City Equipment Co. 163
Troyer Equipment Co., Stanley B. 162
Twin Disc Clutch Company 62

Union Building & Equipment Co. 154
Unit Crane & Shovel Corporation 104
*United Steel Fabricators, Inc. 126

Vandeventer Auto Sales 157, 163
Visking Corporation 65

Waite Construction Co., J. P. 163
Warn Manufacturing Co. 100
Waukesha Motor Company 125
Wenzel Machinery Co. 158
White Manufacturing Company 150
White Motor Company, The 61
White Tractor Company 157
Williams Construction Company 162
Wilson Machinery & Supply Co. 154

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Down time is no joke. Say it happens when a clutch facing or a brake lining wears out.

If you replace with a Caterpillar-built part, here's what you're sure of: a friction part that's made of a material with high torque capacity but low friction loss, a long-wearing material that *really* resists glazing and chipping, a tough material that's been through rugged tests in the laboratory, on the proving ground, and out on actual jobs. In short, you're sure of *less* down time in the future.

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Better get genuine Caterpillar parts every time.

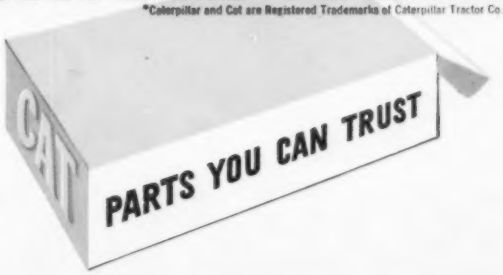
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These are genuine CAT* brake linings. They're made of a specially designed molded asbestos material. You can't buy better anywhere.

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. . . for more details circle 190, page 14





Contractor
HELDENFELS BROTHERS
Corpus Christi, Texas

Laying hot-mix Texaco Asphaltic Concrete on

12 miles of Corpus Christi streets

Old streets in six residential sections of Corpus Christi, Texas, needed resurfacing. Busy 57-foot-wide Baldwin Boulevard required a complete pavement, including base and wearing surface. Hot, plant-mixed Texaco Asphaltic Concrete was used exclusively in this city's entire 12-mile street improvement program.

On Baldwin Boulevard, a 6-inch thickness of Texaco Asphaltic Concrete was laid directly on the prepared subgrade. It consisted of a 4½-inch coarse-graded asphaltic concrete base, laid in two courses, topped by a 1½-inch dense-graded asphaltic concrete surface. This all-asphalt type of pavement is capable of absorbing heavy impact year after year, with a minimum of upkeep. It is asphalt's answer to the gruelling traffic served by a city's principal thoroughfares.

In the residential areas of Corpus Christi, a 1½-inch dense-graded Texaco Asphaltic Concrete surface was laid on a number of old asphalt streets. The new surface forms a perfect bond with the old, economically adding many additional years to the long service already delivered by the original streets.

Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils for 50 years have provided city officials with many answers to the street paving problem. Helpful information on all types of asphalt construction for city streets is supplied in two free booklets, which can be obtained without obligation by writing our nearest office.



Baldwin Boulevard, one of Corpus Christi's main thoroughfares, is paved with 6 inches of hot, plant-mixed Texaco Asphaltic Concrete, laid on the prepared subgrade.



A new 1½-inch dense-graded Texaco Asphaltic Concrete surface economically adds many years to the life of the old asphalt pavement on this Corpus Christi residential street.

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Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Minneapolis 3 Philadelphia 2 Richmond 19

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REG. T. M.

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. . . for more details circle 248, page 1